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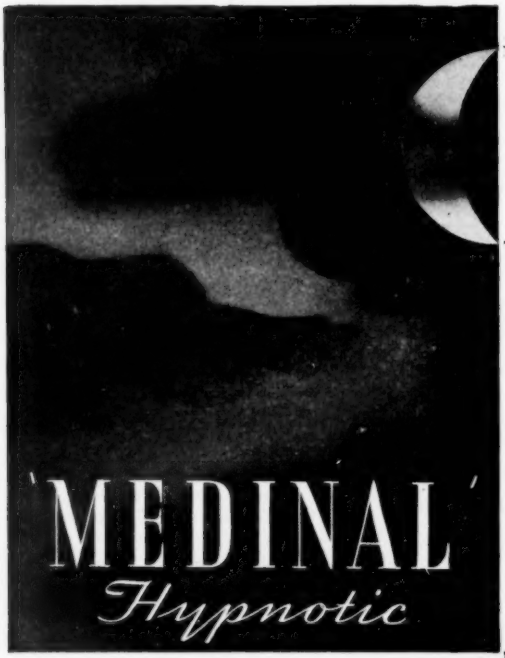

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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

ADDRESSES AND ORIGINAL ARTICLES

Surgical Treatment of Arterial Hypertension. By P. B. ASCROFT, F.R.C.S. 113

The Mechanism of Diabetes Mellitus. By Prof. H. P. HIMSWORTH, F.R.C.P.—II. Control of the Blood-sugar Level—(*continued*)—(*with chart*) 118

Cyanosis Caused by Sulphonamide Compounds. By Prof. D. CAMPBELL, M.D., and T. N. MORGAN, M.D.—(*with charts*)..... 123

Effect of Sulphanilamide on the Blood in Scarlet Fever. By JANE O. FRENCH, M.D.—(*with charts*) 127

Fractured Patella Treated by Excision of the Fragments. By H. DODD, F.R.C.S.—(*illus.*)..... 130

Complete Freedom from Dental Caries: A Comparative Study of Twenty-five Children. By H. G. MILLER, M.B., and D. M. R. CROMBIE, L.D.S. 131

MEDICAL SOCIETIES

Royal Society of Medicine: Section of Surgery: Heparin in the Prevention of Thrombosis 133

Oxford Ophthalmological Congress: Chiasmal Lesions—Vital Staining—Orthoptics—The Aqueous Humour—Miners' Nystagmus—Protection of the Eyes.. 134

Society for the Study of Inebriety: Alcohol and Drug-addiction in Relation to Crime 136

Association of Clinical Pathologists: Clinical Pathology of Tuberculosis 137

REVIEWS AND NOTICES OF BOOKS

The Building of a Nation's Health. By Sir George Newman, F.R.C.P. 139

Thorpe's Dictionary of Applied Chemistry. By Prof. J. F. Thorpe, F.R.S., and M. A. Whiteley, D.Sc. 140

Tropical Medicine. By Sir Leonard Rogers, F.R.C.P., F.R.S., and Sir John W. D. Megaw, M.B. 140

Klinische Chemie und Mikroskopie. By Dr. L. Hallmann 140

Classic Descriptions of Disease. By Prof. R. H. Major, M.D. 140

LEADING ARTICLES

THE WATERED MILK BILL 141

THE STOMACH IN PERNICIOUS ANÆMIA 141

THE HOLIDAY 142

ANNOTATIONS

The Process of Ageing.... 143

Colostrum and Immunity . 143

The Frontal Lobes 144

Treatment of Serum Sickness 144

A Pioneer in Biochemistry . 144

The Almoner at the V.D. Clinic 145

A Friend of Childhood ... 145

Errors in the Differential Blood-count 145

Tissue Respiration 146

Opium and Codeine 146

Blood-donors Coming in Slowly 146

Bornholm Disease 146

National Camps..... 147

Chemotherapy and the White Cells..... 147

Danzig Scheme for Early Detection of Cancer 147

GRAINS AND SCRUPLES

From a Woman Public-health Officer—III 156

SPECIAL ARTICLES

Prevention and Treatment of Puerperal Sepsis Due to Hæmolytic Streptococci. By Prof. D. BAIRD, M.D., A. M. MICHIE, M.B., and R. F. MACDONALD, M.B..... 148

War Neuroses: Service Views and Experience—Propaganda and Discipline 152

Mental Hospitals Association: Divorce for Insanity—Present Situation of Mental Hospitals 154

Medicine and the Law: A Miscarriage..... 155

Infectious Disease in England and Wales..... 157

THE LANCET 100 Years Ago 169

LETTERS TO THE EDITOR

Chemotherapy and the White Cells (Dr. Leonard Colebrook) 158

The Problem of Medical Literature (Mr. W. R. Le Fanu) 159

The New Zealand Position (Dr. Wm. Brown)..... 159

Proprietary Names or Pharmacopœial Equivalents (Dr. T. Ferguson Rodger and others)..... 159

Psychotherapy by Laymen (Dr. E. B. Strauss and others)..... 160

Pensions for Spinsters? (Miss Florence White)... 160

PARLIAMENT

On the Floor of the House 161

From the Press Gallery: Milk Policy—Scottish Health Services 161

Question Time: Cheap Milk in Scotland—Maternity Hospital Accommodation—Foster Mothers—Blacklisted Elementary Schools—Medical Education in West Africa..... 163

OBITUARY

Henry Havelock Ellis, F.R.C.P.—(*with portrait*) 164

Sydney Backhouse Hulke, F.R.C.S. 165

David Macmillan, M.D. 165

MEDICAL NEWS

University of Cambridge.. 166

University of London 166

University of Aberdeen ... 166

Royal College of Surgeons of England 166

University of Manchester.. 166

University of Dublin 166

College of Physicians of Philadelphia 167

Society for Relief of Widows and Orphans of Medical Men 167

Travelling Fellowships ... 167

Royal Free Hospital 167

Middlesex Hospital 167

Mandsley Hospital 167

British Empire Cancer Campaign 167

An Appointment to India. 168

Leverhulme Research Fellowships 168

A Visit to Germany 168

V.D. Treatment during Military Training 147

Footwear and Fitness..... 165

The Dixon Memorial Hall, Dublin..... 165

NOTES, COMMENTS, AND ABSTRACTS

Jenner as Royal Physician 170

The Brain Made Easier.... 170

Transfusion Syphilis 170

The Unit of Practice..... 170

Medical Journals and Books for China 170

The Medical Directory ... 170

Appointments 168

Vacancies 168

Medical Diary 169

Births, Marriages, Deaths 169

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SURGICAL TREATMENT OF ARTERIAL HYPERTENSION *

By P. B. Ascroft, M.S. Lond., F.R.C.S.

ASSISTANT SURGEON AT THE MIDDLESEX HOSPITAL, LONDON; STREATFEILD RESEARCH SCHOLAR, ROYAL COLLEGE OF SURGEONS OF ENGLAND

High blood-pressure is the commonest cause of death in the second half of life. After fifty 1 death in 4 is due to arterial hypertension or its consequences.[18] In a series of 82 cases of arterial hypertension studied post mortem by Fishberg[20] 72 were "essential" and only 10 nephritic. By essential hypertension he means all cases of chronic hypertension without clinical or anatomical evidence of antecedent renal disease. The average age at death due to essential hypertension is fifty-five. In a group of 420 hypertensive patients death was due in some 60 per cent. to cardiac failure, 20 per cent. to cerebral accidents, and less than 10 per cent. to renal failure.[5] The large majority of patients with arterial hypertension die relatively early owing to mechanical strain on the heart and arteries. It has been widely maintained that arterial hypertension is a compensatory mechanism designed to improve the circulation to the tissues generally or to a particular organ that requires extra oxygen and nutriment, and on this account a laissez-faire attitude has been adopted towards the treatment of high blood-pressure. This attitude is encouraged by the observation that chronic hypertensives often feel worse when their blood-pressure falls; but the commonest cause of a falling blood-pressure in arterial hypertension is failure of the left ventricle, which can by no means be regarded as beneficial.

It is well known that cardiac output is seldom increased in hypertension,[29] pressure being maintained by generalised increase in the peripheral resistance due to narrowing of the arterioles. Since capillary pressure approximates to normal,[17] at all events in most of the body, and since metabolic exchanges take place in the capillary bed and not in the arterioles, it follows that the needs of the tissues for oxygen are no better served in the hypertensive than in a person with a normally adjusted circulation. Though we are certain that the general efficiency of the circulation is not improved by high arterial pressure, the question of selective circulatory increase cannot be so readily answered. It is easy to accept the idea that changes in an organ or tissue whose function is impaired directly by disease or indirectly by reduction of its normal quota of blood may induce an increase in the arterial pressure, with the result that extra blood is shunted towards it. The organ that has attracted greatest attention from this point of view is the kidney, which is unique in requiring something more than an adequate rate of blood flow for its proper function. A considerable head of pressure in the afferent glomerular arterioles is vital, the average being about 100 mm. Hg, and, when the pressure falls below 40 mm. Hg, filtration through Bowman's capsule ceases. Many accept the theory that hypertension in renal disease is simply an attempt on the part of the body to improve the renal circulation. However attractive this teleological reasoning in nephritic hypertension, it cannot readily be applied to essential hypertension, which is ten times commoner. Further, those who believe that hypertension is a beneficial compensatory mechanism must admit that the cure is worse than the disease, for 80 per cent. of hypertensives die as a direct result of cardiovascular strain, whereas less than 10 per cent. succumb to renal failure.

The position as regards hypertension may be summarised thus:—

(1) There is no increase in general circulatory efficiency. There may or may not be increased circulatory efficiency in some particular organ. In other words, hypertension is probably not a beneficial adjustment.

(2) Death usually takes place as a direct result of raised blood-pressure.

It therefore appears that there is no fundamental objection to methods designed to reduce the blood-pressure in essential hypertension and perhaps in other kinds of arterial hypertension.

Factors Controlling Blood-pressure

Before describing the forms of surgical treatment that have been advocated, it is necessary to consider shortly how the blood-pressure is regulated in normal circumstances, and how the regulatory mechanism is perverted in essential hypertension. Arterial pressure is directly proportional to the product of the cardiac output and the peripheral resistance. In essential hypertension and the hypertension of chronic nephritis cardiac output is not raised[29]; consequently the rise in pressure is due to increased peripheral resistance, which in turn depends on the calibre of the vessels and on the viscosity of the blood. In essential hypertension and the hypertension of chronic nephritis viscosity and the volume of the circulating blood are substantially unaltered[20]; hence the only effective factor in increasing peripheral resistance must be narrowing of the blood-vessels. The lumen of a blood-vessel may be reduced by a change in the structure of its wall or by active contraction of its muscular coat. Gull and Sutton[21] believed that endarteritis and thickening of the intima, or sclerosis of the media, in the arterioles and capillaries were the cause of hypertension in chronic Bright's disease, but true generalised arteriosclerosis does not exist in association with nephritis, still less with essential hypertension; in fact, as Fishberg[20] says, all available evidence points decisively in the opposite direction—i.e., that the hypertension causes such arteriolar lesions as are found.† Hypertension, both essential and nephritic, must therefore be due to active contraction of the muscular coats of the arterioles. The factors which may directly influence vasomotor tone are either nervous or chemical.

NERVOUS FACTORS

Stimulation of vasomotor nerves is known to increase blood-pressure, and the notion that vasoconstriction of nervous origin is responsible for arterial hypertension is attractive alike for its simplicity and because it suggests a means of surgical attack. But such arguments must not be accepted uncritically. More than one surgeon has been duped by scientific confidence tricks of this kind and has become an indiscriminating destroyer of portions of the sympathetic system, to the lasting injury of

* Hunterian lecture delivered at the Royal College of Surgeons on June 2, 1938.

† The histological evidence of Moritz and Oldt,[41] however, suggests that renal arteriosclerosis is the primary lesion in essential hypertension.

this branch of therapeutics. In 1936 two papers of great importance appeared: Pickering [28] and Prinzmetal and Wilson [53] independently and by different techniques have shown that the pressor agent in essential hypertension and hypertension of chronic nephritis is not nervous. The methods consisted essentially of measuring the blood flow in the arms of hypertensives after cutting off all vasomotor impulses thereto. If hypertension is due to nervous constrictor impulses, their removal from a small area of the vascular bed, such as the arm vessels, will cause an abnormal increase in blood flow. This does not, in fact, take place; hence it follows that the abnormal vascular tone is not nervous, at all events in the arm and peripheral circulation generally, although, as Pickering is careful to note, this does not necessarily apply to all internal organs. It is possible to produce hypertension in animals by injecting kaolin into the cisterna magna or by denervating the carotid sinus and dividing the depressor nerves, and it has been suggested that human essential hypertension is due to ischæmia of the medulla oblongata or to disorder of the carotid sinus and aortic reflexes, leading to excessive vasoconstrictor impulses. The observations recorded above dispose of both hypotheses (see also Bouckaert et al.[7] and Pickering et al.[51]).

CHEMICAL FACTORS

Adrenaline.—The powerful pressor action of adrenaline, so often called into play under physiological conditions, renders this substance suspect as a predominating cause of essential hypertension. The opposing evidence is so weighty, however, that it will suffice to summarise it to shatter what Janeway [37] has called "the beautiful dream of adrenalinæmia."

(1) Using a test capable of detecting adrenaline in a dilution of 1 in 700 million, Hülse [35] examined the blood of hypertensives and found no trace. This has been confirmed by Rogoff and Marcus.[56]

(2) Minute doses of adrenaline dilate rather than constrict blood-vessels.

(3) Pressor doses of adrenaline reduce the peripheral blood flow. This is unaltered in essential hypertension.

(4) Pickering and Kissin [50] find that patients with essential hypertension or chronic nephritis are not unduly sensitive to adrenaline.

(5) The rare instances of paroxysmal hypertension known to be due to tumours of the suprarenal medulla do not resemble essential hypertension and are promptly cured by removal of the tumour.

(6) Denervation of the suprarenals, with or without destruction of the medullary tissue, does not substantially reduce the pressure in essential hypertension.[21 27]

Suprarenal cortex.—Tumours of the suprarenal cortex occasionally appear to be the cause of paroxysmal hypertension, and hyperplasia of the cortex has been observed in essential hypertension, especially when associated with Cushing's syndrome. Such hyperplasia is, however, more often absent in hypertension and often present when the blood-pressure is normal, and there appears to be no reason to regard the average case of essential hypertension as due to disorder of the suprarenal cortex.

Pituitary.—In 1932 Cushing [15] drew attention to a peculiar condition, now known by his name, in which a basophil adenoma of the pituitary gland is associated with hypertension and certain striking bodily changes. Cushing put forward the theory that an excessive secretion of the pressor principle of the posterior lobe of the pituitary was responsible for the hypertension. This theory has been extended to serve as a possible explanation of the raised pressure in essential hypertension; but, before it can be accepted as an explanation of the average case, it remains for this pressor principle to be demonstrated in the blood or in the cerebrospinal fluid of essential hypertensives. Further, the clinical features of Cushing's syndrome are so dramatic that one cannot accept too close a comparison with ordinary cases of high blood-pressure. It must, however, be admitted that this is no argument against the raised blood-pressure being due to the same cause in both types of case. Page and Sweet [46] have shown that hypophysectomy in dogs with experimental renal hypertension often reduces the blood-pressure to the normal level, but they believe the effect to be indirect and not due to removal of the pressor principle of the posterior lobe of the pituitary. It is possible that the pituitary gland may play a part in the form of hypertension known as climacteric, which affects women passing through the natural or artificial menopause.

Other vasoconstrictor substances.—Since the vasoconstriction which is responsible for arterial hypertension is not nervous and there is no good reason to incriminate the endocrine glands, we must look elsewhere. In the last few years a very considerable body of evidence has accumulated pointing to the kidney as the origin of the pressor substance. Before passing on to discuss the rôle of the kidney, we may mention briefly some of the older views on the ætiology of high blood-pressure, as taught to students a few years ago. These are epitomised in the familiar mnemonic G L A S S: G for gout, L for lead, A for alcohol, S for syphilis, and S for strain. Gout and lead poisoning are unimportant nowadays. Alcoholism and indulgence of all kinds have been blamed for hypertension among other evils, but alcoholics have a low rather than a high blood-pressure, and cardiac hypertrophy is uncommon among them. Gluttony has long been held to be a potent cause of high blood-pressure, and no doubt they are often associated. Just how overeating causes high blood-pressure is by no means clear. Consumption of large quantities of meat and other proteins has been held responsible, without good evidence, and those hypertensives of carnivorous tendencies whose doctors forbid them meat might quote the interesting case of Stefannson, the arctic explorer, who spent eleven and a half years within the arctic circle, nine years of which he subsisted on meat alone, including a period of nine consecutive months. His blood-pressure was 115/55. Tobacco may be a subsidiary factor of some importance. Dixon (1918) found that smoking of a Manila cigar by a novice caused a rise of 20 to 25 mm. in systolic pressure (which was followed half an hour later by a sharp fall), and others [33 34 38 40] have shown that a single cigarette causes distinct peripheral vasoconstriction and often a rise in blood-pressure. Syphilis has been accorded a prominent place among the causes of high blood-pressure. Fishberg,[20] however, does not find the incidence of positive Wassermann reaction greater in hypertensives than in the general hospital population.

Hard work and hard living are widely believed to be important, if not predominant, causes of essential hypertension, but the athlete and the manual worker are no more prone than the clerk to high blood-pressure. The danger does not appear to be physical strain but what is popularly known as "the strain of modern life." There is some doubt, however, whether this portentous phrase means much more than the manifold worries and irritations which beset us all. Those who live high-pressure lives are perhaps more liable to hypertension; on the other hand, there

are many with hypertension who appear to be without a care and to have led a completely sheltered existence. Neurasthenics usually have low blood-pressure. Fishberg [20] sums up as follows:—

"In all probability, emotional and mental strain play purely an accessory rôle in the genesis of essential hypertension, serving to precipitate or aggravate the increase of blood pressure in those individuals who have inherited some constitutional predisposition to essential hypertension, which is of such fundamental importance."

RÔLE OF THE KIDNEY

Since the days of Bright (1836),[8] who first observed the association of chronic nephritis with enlargement of the heart and thickening of the blood-vessels, until the end of the century hypertension was believed to be due to renal disease or to arteriosclerosis. With the introduction of the baumanometer by von Basch (1893) [4] and the brilliant work of Clifford Allbutt (1895 and later) [1] it became evident that hypertension was extremely common and previous clinically recognisable renal disease the exception. In recent years attention has again been focused on the kidneys, particularly by the experiments of Goldblatt and his associates,[24-28] who have crystallised the tentative work of numerous investigators by developing a standard technique for producing persistent hypertension of renal type in animals. They partly occlude one or both renal arteries with adjustable clamps and find that loose constriction causes no rise in pressure, whereas moderate constriction causes the pressure to rise within a few days or weeks to a level often double the normal and to remain at a high level for at least five years. If the arteries are severely constricted, pressure rises rapidly, often to a very high level, and the animal dies in uræmia within weeks or months. If the arteries are totally occluded, the animal dies of renal failure within a few days, often with a fall in pressure. Similar constriction of other vessels, such as the splenic, mesenteric,[19] or both femoral arteries, does not affect the blood-pressure. Since some of Goldblatt's dogs have been observed to have a systolic pressure of 250 mm. for five years without signs of renal failure, the resemblance to essential hypertension in man is striking, and in the hope of elucidating the mystery of essential hypertension Goldblatt and others have made the following observations in experimental hypertension due to renal ischæmia:—

(1) This form of experimental hypertension is not due to renal failure, because (*a*) in most instances clinical and chemical signs of renal failure do not develop at all or only after years, and (*b*) constriction of the main artery of one kidney without interference with the other often causes a considerable rise of pressure persisting for months. If the ischæmic kidney is excised, the blood-pressure quickly falls to normal.[26] There is a striking parallel to the observation in human pathology. Several cases have recently been reported of unilateral "surgical" kidney (the other kidney being sound) associated with arterial hypertension [3 9 30]; removal of the affected kidney was followed by fall of pressure to normal.

(2) Hypertension due to moderate constriction of the renal artery is not due to fixed changes in the renal parenchyma. If the clamps are removed after hypertension has developed, the pressure promptly falls to normal.[26]

(3) Hypertension is not due to nervous impulses. The kidneys may be denervated,[43] the splanchnic nerves may be cut,[27] or the animal may be totally sympathectomised,[21] without more than momentarily reducing established hypertension and without preventing it when the renal arteries are subsequently constricted. Again, hypertension develops in the usual way when a transplanted kidney is rendered ischæmic.[6] Denervation or destruction of the adrenal medulla is equally ineffective in preventing or reducing hypertension.[26]

(4) Goldblatt [26] has shown that excision of both suprarenal glands prevents or reduces the hypertension of experimental renal ischæmia, even when the animal is kept alive for months with sodium-salt treatment. If only a fragment of cortex remains, or if cortin is given, the pressure is not reduced. Houssay [19] interprets this as meaning that cortin favours the production of vasoconstrictor substance by the kidney or renders the vasoconstrictor mechanism sensitive to its action.

(5) A pressor substance may be prepared from ischæmic kidneys.

Forty years ago Tigerstedt and Bergmann [57] prepared a pressor substance from normal kidneys. This pressor substance has been called renin, and recently Pickering and Prinzmetal [32] and Landis et al.[29] have extracted it from normal kidneys in considerable quantity and demonstrated its extraordinarily powerful and prolonged pressor action. Landis makes the important point that renin, unlike adrenaline, pituitrin, and other substances that raise the blood-pressure, does not decrease the peripheral blood flow—a most significant observation, for neither is peripheral blood flow decreased in human hypertension. Harrison et al.[22] and Prinzmetal and Friedman [54] claim to have demonstrated abnormal quantities of renin in ischæmic kidneys of hypertensive dogs. Houssay and his co-workers,[19] in a superb series of experiments, confirm the growing impression that hypertension of renal ischæmia is due to a pressor substance formed in the affected kidney. They grafted the ischæmic kidneys of hypertensive dogs on to the main neck vessels of normal dogs and found a consistent and prolonged rise in blood-pressure. One animal of their series possessed a kidney with two renal arteries. One was constricted by an adjustable clamp rendering half the kidney ischæmic. When this kidney was transplanted, the unconstricted renal artery was first anastomosed. There was no rise in pressure. The constricted artery was then anastomosed, and the pressure rose.

Houssay suggests that this renal pressor substance (renin) is eliminated or destroyed by the normal kidney, and he summarises his evidence as follows: (*a*) when the renal artery to one kidney is constricted, a moderate slow rise of pressure takes place, which often falls to normal; (*b*) if the healthy kidney is then removed, there is a rapid rise in pressure; (*c*) the grafted ischæmic kidney has a greater pressor effect in nephrectomised dogs than in those with normal kidneys; and (*d*) in an animal with one renal artery constricted venous blood of the sound kidney had less vasoconstrictor effect than its arterial blood. As the last statement implies, Houssay has demonstrated a pressor substance in the venous blood of ischæmic kidneys which has a powerful vasoconstrictor action, so removing a serious objection—namely, failure to demonstrate a pressor substance in the blood—to the renin theory of experimental renal ischæmic hypertension.

To sum up, severe hypertension may be established in animals by partial constriction of the renal arteries. It is due to excessive production or abnormal action of a pressor substance (renin) in the affected kidney. This substance is present in the normal kidney and is eliminated or destroyed by the normal kidney.

The action and/or production of renin is influenced by the suprarenal cortex.

Surgical Treatment

Nearly all the operations to be described, designed to reduce arterial hypertension in man, are directed towards denervation of the kidneys, suprarenal glands, and the splanchnic area, since surgeons have believed (partly on faulty and incomplete evidence, partly wishful thinking) that essential hypertension is largely due to excessive vasomotor activity of nervous origin. From the evidence so far adduced the prospect of success of operation on the sympathetic nerves for hypertension seems remote; but the proof of the pudding is in the eating, and the results of surgical treatment of human hypertension will now be examined, the relation of human and experimental hypertension discussed, and possible accessory surgical methods mentioned.

In 1923 Pende recommended section of the left splanchnic nerve; in 1925 Brown and Pointer performed bilateral lumbar sympathectomy without success; in 1928 Crile treated 5 patients by removal of one suprarenal gland, without any fall in pressure, and in 1937 Friedman and Eisenberg [33] reported 5 patients treated by bilateral partial adrenalectomy, of whom 2 died of adrenal insufficiency and 3 were unimproved. Denervation of the kidneys by stripping the renal pedicle is equally disappointing (at all events in advanced cases, but see Pickering [49]). In none of these patients was there serious renal impairment.

The only "denervating" operations which have been at all encouraging involve division of the sympathetic nerves of the splanchnic area. This may be carried out in four ways:—

(1) By interrupting the sympathetic outflow by cutting the anterior nerve-roots from the sixth thoracic to the second lumbar segment.

(2) By dividing the splanchnic nerves and the sympathetic chain above the diaphragm.

(3) By dividing the splanchnic nerves and lumbar chain below the diaphragm.

(4) By removal of the cœliac ganglia.

(1) Page and Heuer [45] report 17 patients, all having diastolic pressures of over 120, treated by section of some half a dozen pairs of anterior nerve-roots from the mid-dorsal region downwards. Their patients were observed eight months to three years after operation, and 4 of the 17 did well. Headache, nervousness, dizziness, fatigue, palpitation, and even fits were relieved, and the blood-pressure fell to 160/100 or lower. A girl of twenty-three,[44] whose blood-pressure before operation was 190/122, was free from symptoms two and a half years later, and her blood-pressure was 150/96 (Fishberg puts the upper limit of normal blood-pressure at 150/90). An inevitable effect of this operation of anterior root section is paralysis of the abdominal wall. This is said to be good, for it allows blood to drain into the splanchnic vessels more readily; but a paralysed abdominal wall is a mixed blessing even in a hypertensive. For this reason and because the necessarily extensive laminectomy is severe and has been followed by transverse myelitis other means of splanchnic sympathectomy are generally used.

(2) Max Peet divides the splanchnic nerves above the diaphragm and resects the lower three ganglia of the thoracic sympathetic chain. The nerves are approached by resecting a small piece of the eleventh rib, and both sides may be dealt with at one stage. His operative mortality in 156 patients is 3·8 per cent.

Frehberg and Peet [23] recently reported results of his operation in 48 patients, whose average age was forty-six, observed three months or longer after operation: 6 were free from symptoms and their blood-pressure was reduced to 160/100 or lower; 8 showed a fall of more than 60 mm. systolic or 30 mm. diastolic; 10 a fall of 30 to 60 mm. systolic or 15 to 30 mm. diastolic; and in 24 the pressure did not fall. An example of a successful case is a man, aged twenty-nine, whose pressure was 236/166. Over two and a half years after operation it was 156/100. Another patient, aged twenty-two, had had hypertension for at least three years. The pressure was 280/190. One year after operation it was 132/95.

Peet [36] now reports the results of his operation in 315 patients in the last five years, claiming "complete recovery in 15% and distinct and permanent lowering of the blood pressure in about half." Peet's cases have been closely studied with regard to renal function, and the important suggestion emerges that, should a patient with some renal impairment react favourably to operation, renal function will improve proportionally to the fall in blood-pressure, and signs of impairment may disappear entirely. Davis and Barker [16] have performed Peet's operation in 6 carefully controlled cases, and they found that in each the blood-pressure had risen to the preoperative level with return of all the distressing symptoms. They found, however, that these patients had become susceptible to cyanate treatment, to which they had not responded before operation.

(3) Adson [2] and his associates at the Mayo Clinic carry out an extensive sympathectomy in two stages by a modified renal approach. The three splanchnic nerves, most of the cœliac ganglion, and the upper two lumbar ganglia and chain are removed on each side, so denervating the suprarenals, splanchnic vessels, and the kidneys. In his earlier cases Adson removed a portion of each adrenal, but he has not done so for the last two years, and the effect of the operation is not reduced. Of 44 cases observed for two to twenty-three months the results are given as good in 11, fair in 13, and poor in 20. By good is meant complete or nearly complete symptomatic relief and a blood-pressure of not more than 160/100. For example, a patient whose maximal pressure was 225/130 and minimal pressure 150/100 was well fifteen months later with a pressure of 128/90. Altogether 156 patients have now been operated on at the Mayo Clinic by Adson's method, and "functional cure" is claimed in 83 per cent.[36]

(4) Crile,[13 14] of Cleveland, has practised bilateral removal of the cœliac ganglion in some 140 patients. He claims symptomatic relief in 78 per cent. of patients, and the operative fatalities are limited to 3 in the last 123 patients. Of 19 patients seen seven months after operation, 3 are reported as having a normal pressure; but Crile does not say what he means by normal—in fact, his tables of results are so difficult to interpret that one cannot usefully quote further figures.

ASSESSMENT OF RESULTS

We now turn to the problem of assessing the value of surgery. To do so accurately is not yet possible. There is no question that improvement of symptoms and blood-pressure often takes place after splanchnic section, but similar improvement is the rule in most patients with hypertension when simply put to bed. Nevertheless, we cannot escape the fact that in some instances surgery has relieved the victims of severe essential hypertension of all symptoms and has rendered them capable of full work, blood-pressure remaining at a normal level for years. An

instance of this kind was recently described by Ogilvie,[42] who writes:

"Four years ago a surgeon of about 40 was forced by rising blood pressure, inability to concentrate, headaches becoming at times intolerable and failing vision to resign his university post and abandon his practice. He underwent the operation of bilateral splanchnicectomy and immediately lost all his symptoms and returned to a normal blood pressure. He obtained another post at a university in another State, and has been in full work ever since, his blood pressure showing no tendency to rise again. I had not the good fortune to meet him, but I met many of his colleagues, and they are agreed that he is now able to work as hard as any of them. To my question as to whether he was as good a man as before his symptoms appeared, they replied that he had lost some of his fire; he was not the 'go-getter' he used to be, but he was still a fine surgeon. . . ."

Though most physicians through whose hands pass many cases of essential hypertension can recall instances of extraordinary symptomatic recovery and some years of useful life in patients apparently at death's door, it appears to be extremely rare for the blood-pressure to return to normal or near normal for any length of time. There is strong evidence, therefore, that splanchnic section is sometimes dramatically successful. The puzzle is to select suitable cases. First, it should be recognised that most hypertensives improve with rest and the usual medical measures; that the average life of a hypertensive moderately afflicted is ten years after the hypertension is first discovered; and that many persons with a systolic blood-pressure of 200 and more lead an active and fruitful life. Whatever part it may eventually play, surgery has today no place in the treatment of the early stages of hypertension. Operation should be confined to victims of severe hypertension—e.g., with a pressure frequently rising to 200/120 and more—whose symptoms are troublesome, and who do not readily improve with rest. This group must be further pruned by eliminating those with distinct renal or myocardial failure or widespread arterial sclerosis, and operation is best avoided after the age of fifty. Of the considerable number of potential candidates for surgery that remains it is found by experience that less than a quarter will obtain notable benefit from operation. Unfortunately there is no infallible means of recognising those cases that will respond favourably except trial by ordeal—i.e., by the operation itself. This is the method employed in cancer surgery. Those patients with gross dissemination are eliminated, but we are obliged to operate on the rest knowing that two-thirds of them are already doomed by dissemination, then undetectable, but not knowing who will be saved and who taken. But, whereas the surgery of cancer is established, that of hypertension is experimental, and it is wrong to sacrifice the majority in favour of the odd case that might benefit. Adson,[10] Child,[11] and Craig [12] have shown that those patients are most likely to respond whose blood-pressures approach the normal when at rest or asleep, when given nitrites, and particularly when lightly anæsthetised with drugs such as sodium pentothal. If to these tests there is no appreciable fall in pressure, the hypertension is said to be fixed, and splanchnic section will almost certainly fail. Unfortunately a good response to these tests, though hopeful, is no guarantee of a good response to operation. Another test, which is attractively direct, is to induce temporarily the effect of splanchnic section by paralysing the splanchnic nerves by injection of Novocain. I have tried this method and believe that it is unsatisfactory; for, if there is no fall in blood-pressure, it may be because injection is misplaced, and, if the pressure does descend, it is as likely to be due to syncope as to splanchnic paralysis, for the procedure causes distress.

CORRELATION OF EXPERIMENTAL WORK AND SURGICAL RESULTS

It remains for us to try to explain the results of splanchnic section: why it often has no effect on the blood-pressure, and why it is sometimes followed by a fall to normal. It may be postulated that in the early stages of essential hypertension blood flow to the renal tissue is reduced by constriction of the renal blood-vessels, especially afferent glomerular arterioles, by nervous impulses. This causes excessive production of renin, which enters the blood-stream, causes generalised vasoconstriction, and raises the blood-pressure. If splanchnic section is undertaken at this stage, the renal arteries dilate and blood-pressure falls. If not, structural changes take place in the arteries, not only rendering dilatation impossible but also causing further narrowing. More renin is produced, a vicious circle is established, and hypertension becomes permanent and progressive. The importance of high intra-arterial pressure as a mechanical factor in producing lesions of the renal arterioles is proved by Wilson and Byrom's [58] recent demonstration in rats of renal vascular lesions typical of malignant hypertension. When the rat is rendered hypertensive by constriction of one renal artery, gross arterial changes are found in the opposite kidney but not in the ischæmic one, whose clamp protects it from the general hypertension.

OTHER MEANS OF SURGICAL TREATMENT

There is a close resemblance between essential hypertension and experimental hypertension due to renal ischæmia, and it seems probable that a pressor substance like renin is at work in man as in animals. The outstanding objection to the chemical (renin) theory of essential hypertension is failure to demonstrate a pressor substance in the blood. Transfusion of even 2 litres of blood of a hypertensive into a normal person does not cause a significant rise in pressure,[47 53] but in these experiments the recipient's kidneys were normal, and there is some evidence to show that normal kidneys remove the pressor substance.[19] The high level of pressure in essential (and nephritic) hypertension is maintained chemically, and the pressor substance is probably of renal origin and may be identical with renin. Assuming for a moment the truth of the renin theory, what is to be done? The obvious course is to improve the renal blood-supply. Goldblatt [25a] states:

"If before constricting the renal artery, the kidney is decapsulated and adipose tissue or muscle is attached to the denuded cortical surface, the accessory circulation becomes very prominent and interferes with the development of permanent elevation of blood pressure."

The astonishing power of vascularisation possessed by the omentum is familiar to surgeons and has been applied in the operation of cardio-omentopexy, developed by O'Shaughnessy.[42a] According to Samaan grafting of the omentum on to the decapsulated ischæmic kidney in a hypertensive animal so improves the renal blood-supply that the blood-pressure falls to normal. This, if true, is an observation of the first importance; but it awaits confirmation. Even if successful in animals it would not necessarily work in man. The essential difference between hypertension due to experimental renal ischæmia and human hypertension is the site of arterial narrowing.

Experimentally, the main renal artery is constricted; in man the afferent glomerular arterioles are probably involved. To benefit human hypertension it would therefore be necessary to establish arterial communications of sufficient size with the afferent glomerular arterioles to raise the pressure therein. Nephro-omentopexy could readily be combined with subphrenic splanchnic denervation, the capsule being stripped from the left kidney and the omentum brought through an incision in the peritoneum and wrapped round it. The right kidney might also be decapsulated in the hope of acquiring a subsidiary blood-supply from the perirenal tissue. It is probably unwise for technical reasons to attempt right or bilateral nephro-omentopexy.

Summary and Conclusions

(1) After the age of fifty 1 death in 4 is due to arterial hypertension.

(2) Renal failure is the cause of death in less than 10 per cent. of cases of arterial hypertension.

(3) Whatever the initial cause of raised blood-pressure in "essential" arterial hypertension, the hypertension itself is the dangerous factor and the commonest cause of death.

(4) The general circulatory efficiency is not increased in essential hypertension.

(5) Consequently, there is no fundamental objection to reducing the blood-pressure in essential hypertension.

(6) Essential and nephritic hypertension is maintained by generalised arterial and arteriolar constriction which is not nervous but chemical.

(7) The hypertensive factor in experimental hypertension due to renal ischæmia is a pressor substance of renal origin known as renin. Human essential and nephritic hypertension closely resemble this form of experimental hypertension.

(8) Surgical treatment of arterial hypertension is still in the experimental stage. Of the operations so far performed wide splanchnic denervation is the operation of choice. Operation should be limited to a small and carefully selected group of patients with severe but still labile hypertension. The result of operation is predictable up to a point but never certain. Brilliant successes have been reported.

(9) Nephro-omentopexy in addition to splanchnic sympathectomy may be of value.

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THE MECHANISM OF DIABETES MELLITUS *

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II—THE CONTROL OF THE BLOOD-SUGAR LEVEL

(*Continued from p. 68*)

RÔLE OF THE LIVER

The discovery by Claude Bernard that the liver secretes glucose into the blood led him to state that the liver was of prime importance in the maintenance of the normal blood-sugar level. His suggestion has been fully confirmed by the experiments on hepatectomised animals.[91] An excellent picture of the functioning of the liver in ordinary circumstances is provided by experiments demonstrating the effect of ingestion of glucose on the inflow and outflow of sugar from the liver. Recently Tsai and Yi [133] have demonstrated that, whereas the liver in the fasting state secretes glucose into the blood, when an excess of glucose enters the blood glucose is removed by the liver. This work has been confirmed in greater detail by Soskin and his colleagues,[125] who have shown that after the hyperglycæmia caused by injection of glucose the liver

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ceases to secrete and stores sugar until the blood-sugar level falls to normal. Then there is a period during which sugar flows neither in nor out of the liver, and finally the liver begins to secrete glucose again. These results are readily interpreted on the basis of the adjustment of the head of pressure of blood-sugar to the needs of the tissues. In the fasting state the liver supplies sugar to the blood in proportion to the peripheral utilisation, and the head of pressure of sugar in the blood thus remains constant. Exogenous hyperglycæmia supplies the tissues with abundant sugar, and the utilisation of this sugar by them is aided by the secretion of pancreatic insulin. As a result the tissues are satiated with sugar and the liver, being no longer stimulated to secrete, is able to store sugar. With the subsidence of hyperglycæmia the peripheral tissues now contain carbohydrate in excess of their needs and the liver is not stimulated to secrete glucose until this excess of carbohydrate is disposed of and the normal needs of the tissues again establish themselves. The reaction of the liver to a fall in the head of pressure of blood-sugar below that requisite for the needs of the tissues is well exemplified in the sequence of events following the administration of phloridzin. In the attempt to prevent the head of pressure of sugar in the blood from falling under the steady drain of glycosuria the stored liver-glycogen is broken down and liberated as glucose into the blood. When this source is exhausted, the liver breaks down body proteins to sugar, and combustion of fat proceeds at an increased rate. The accelerating combustion of proteins and of fat is reflected in the urine by increasing excretion of nitrogenous substances and of ketone bodies. After removal of the pancreas a similar increased combustion of protein and fat takes place, and the dependence of these processes, as well as the maintenance of the blood-sugar at high levels, on hepatic activity is shown by their disappearance after hepatectomy.[21 95 102] The manner in which the various endocrine glands influence these reactions of the liver has already been discussed.

Little is known about the mechanism which controls the liver in its accurate and rapid adjustment of the blood-sugar level. Although the action of adrenaline in stimulating hepatic glycogenolysis is adequate to explain the recovery of the blood-sugar level when this falls below 70–80 mg. per 100 c.cm.,[19] it is not adequate to explain either adjustment at higher blood-sugar levels or the prompt and delicate adjustment at normal levels. The existence of some other mechanism is suggested by the extreme susceptibility of animals injected with anterior-pituitary extracts to emotional hyperglycæmia and by their normal response to intravenous adrenaline. That the mechanism of adjustment is extremely sensitive is shown by experiments with pancreatic grafts in otherwise depancreatised dogs; within a few minutes of excluding the graft from the circulation the blood-sugar begins to rise, only to return and remain at normal levels again when the circulation to the graft is restored.[47] According to Macleod [88] stimulation of the hepatic nerves can initiate glycogenolysis in the liver, and it may be that not only the immediate adjustment of hepatic outflow of sugar but also the secretion of the anterior-pituitary gland are controlled by some centre in the brain which is extremely sensitive to decreasing utilisation of carbohydrate, whether this be due to lack of carbohydrate or impaired ability to deal with the carbohydrate available.

The question of the interaction of the liver and the blood-sugar level cannot be left without considering the interesting hypothesis of the homeostatic function of the liver advanced by Soskin [121 125] and widely accepted in America. According to this theory the decision as to whether the liver secretes sugar depends on whether the blood-sugar is below or above a certain threshold value. This threshold value is influenced by insulin and by the secretion of the anterior pituitary: when the supply is deficient or the pituitary secretion is excessive, the threshold is raised, with the result that the liver pours sugar into the blood and a state of "diabetes" is produced; when the supply of insulin is excessive or the pituitary secretion is diminished, the threshold is lowered, the liver removes sugar from the blood, and hypoglycæmia results. The conception we have been developing in these lectures regards hepatic function as a process adjusted to the needs of the tissues for sugar and subserving the definite object of maintaining the requisite head of pressure of blood-sugar. The homeostatic theory, on the other hand, regards the blood-sugar level as an expression of activity of the liver and this activity as being determined not by the needs of the tissues for carbohydrate but by the particular state of the liver at any one time. Since the liver plays such an important part in carbohydrate metabolism, the homeostatic theory naturally offers many convenient explanations of this aspect of metabolism, but it fails completely to account for the observed correlations of hepatic functions with utilisation of sugar by the peripheral tissues. As an example of this failure the effect of starvation may be quoted. Starvation causes the blood-sugar tolerance curve to rise to high levels; utilisation of sugar by the peripheral tissues normally increases with the height of the blood-sugar; yet after starvation the normal effect of glucose in increasing the oxidation of carbohydrate is greatly diminished, and according to Mann [91 92] and Drury,[34] though not to Soskin and Murphy,[123] in starvation carbohydrate utilisation by the peripheral tissues is impaired. Again, according to this theory, hypophysial extracts lower the threshold at which the liver secretes sugar into the blood; but an explanation is also required of why the same extracts simultaneously inhibit insulin action in the peripheral tissues. It appears that, although the homeostatic theory offers many reasonable explanations of hepatic functions considered as a self-contained phenomenon, it does not throw any light on the relation of this function to carbohydrate metabolism as a whole.

Before leaving the question of the rôle of the liver, attention must be drawn to some remarkable experiments which may ultimately prove of great importance. Markowitz, Mann, and Bollman [96] have shown that after total removal of the liver there is a steady decline in muscle-glycogen, and that, although partially hepatectomised animals readily form muscle-glycogen, totally hepatectomised dogs do not do so unless relatively enormous quantities of insulin and glucose are injected. They have also shown that insulin action is normal shortly after hepatectomy but may be completely abolished several hours later. In rabbits in which the liver was excluded without anæsthesia I have confirmed this fall in muscle-glycogen, and I have also found impairment of insulin action in animals from which the liver had been excised. This work suggests the possibility that the liver is requisite for effective insulin action in the peripheral tissues, and in this connexion it may be recalled that numerous cases of diabetes

mellitus which have shown a high grade of insulin resistance have been cases complicated by disease of the liver.[4 37 109 114 130] Impressed by these observations and by experiments indicating that insulin action in the peripheral tissues varied in different circumstances I suggested that the liver might secrete a substance which activated insulin.[59 60] This suggestion still stands and has recently been supported by Krebs's observations [82] that insulin is susceptible of activation.

PANCREATIC DIABETES AND INSULIN ACTION

After removal of the pancreas from an animal a syndrome develops which is closely similar to human diabetes mellitus. The blood-sugar level rises and glycosuria is produced. The excessive breakdown of body protein is shown by an increased excretion of urinary nitrogen, and the excessive utilisation of fat by ketonuria.[136] All these findings can be diminished by hypophysectomy, and all, except possibly the increased excretion of nitrogenous bodies in the urine, can be induced in the normal animal by extracts of the anterior-pituitary gland.[72 73 117] Removal of the liver from the depancreatised dog leads to a fall of blood-sugar,[95] of urinary nitrogen, and of ketonuria, and in the normal animal it prevents the effects of pituitary extracts.[73] Thus the liver is the seat of the positive reactions to pancreatectomy—namely, hyperglycæmia,[95] increased breakdown of body protein,[91] and production of ketone bodies [21 102]—and this response of the liver is facilitated by the secretion of the anterior hypophysis. These reactions are called forth by deprivation of insulin, and administration of insulin restores the metabolism of the depancreatised dog to normal. Under its action the blood-sugar falls to normal levels, glycosuria and ketonuria disappear, and the excessive excretion of nitrogen in the urine diminishes. At the same time dietary carbohydrate is retained in the body, ingested protein is no longer hastily broken down to glucose, and the disproportionate utilisation of fat ceases. But to prevent the return of the diabetic syndrome insulin must be given in adequate and regular doses. The necessity for an adequate supply of insulin must be clear to every physician who has balanced a diabetic patient. The presence of a regular supply of pancreatic insulin in the healthy subject is indicated by the relatively rapid appearance of hyperglycæmia after pancreatectomy [95] and by contrasting the irregular control of the blood-sugar, achieved by two daily injections of insulin, in the depancreatised animal with the steady control which follows the establishing of a pancreatic graft.[47] To preserve normal metabolism a regular and adequate supply of insulin must be maintained, and this implies that in the course of metabolism insulin is destroyed.

The mechanism of insulin action within the individual cell is still unknown, and even on questions of its general effect within the body controversy still exists. Some workers still hold to the opinion that after pancreatectomy the ability of the animal to utilise carbohydrate is unimpaired and regard diabetes mellitus as due primarily to overproduction of sugar. Since this point is of such fundamental importance, it is necessary to indicate the oversight which has led to this opinion. Lusk [87] established that in diabetic animals the respiratory exchange was theoretically compatible with the idea that such animals had lost the power to use glucose; but, since this interpretation of his results depends on the assumption, now being challenged, that animals cannot change fat into carbohydrate, his conclusions are not universally accepted. Evidence that the peripheral tissues of the depancreatised animal can use some glucose is provided by the rapid decline of the blood-sugar that follows hepatectomy in the depancreatised animal,[95] and this evidence has been supported by the demonstration that hypophysectomy in the depancreatised animal partially restores the animal's power to oxidise carbohydrate.[13 72 73 74 120] The dependence of this peripheral utilisation of sugar on the blood-sugar level has been demonstrated by Soskin and Levine,[126] who have shown that in eviscerated animals the rate at which the peripheral tissues use injected glucose is proportional to the height of the blood-sugar, and further that in such preparations made from depancreatised dogs the rate of sugar utilisation, at blood-sugar levels characteristic of the depancreatised animal, is of the same degree as occurs at normal blood-sugar levels in the preparations made from normal animals. In view of this evidence the original idea that the depancreatised animal has completely lost the power to utilise carbohydrate cannot be maintained, but this new evidence does not permit the assumption that the power to utilise glucose is unimpaired. The fact that the most characteristic action of insulin is to accelerate removal of sugar from the blood by the peripheral tissues [18 91 94] in itself suggests that in the depancreatised animal the ability of the peripheral tissues to do this would be reduced. So long ago as 1912 it was shown by Knowlton and Starling [81] that the hearts of diabetic dogs used less sugar than the hearts of normal dogs, and it has since been shown that the same is true of other tissues.[38 111] Many of Lusk's experiments are acceptable on the basis that in diabetes utilisation of sugar, although not lost, is impaired. The observation that in eviscerated normal animals hyperglycæmia accelerates the utilisation of carbohydrate, whereas in eviscerated diabetic animals with the same degree of hyperglycæmia the utilisation of carbohydrate is not increased, demonstrates that in the latter animals under these conditions peripheral utilisation is impaired.[126] The most probable explanation of these findings seems to be that the tissues of the body have an inherent capacity to utilise sugar at a slow rate, but that, when the blood-sugar level is within normal limits, their capacity to utilise carbohydrate at a normal or rapid rate depends on an adequate supply of insulin. The whole controversy that has centred round the two rival theories of diabetes—the "overproduction theory" and the "under-utilisation theory"—appears to have arisen because it has not been realised that there are mechanisms in the body which can do much to mitigate the effects of impaired ability to utilise carbohydrate. The opposing ideas, either that in pancreatic diabetes the power to utilise carbohydrate is lost or that it is unimpaired, are both unable to explain large numbers of established facts; but, so far as I am aware, there are no facts incompatible with the hypothesis that in pancreatic diabetes the utilisation of carbohydrate is impaired, but that this impairment is largely compensated by adequate elevation of the head of pressure of sugar in the blood with consequent acceleration of carbohydrate utilisation.

Naturally the different conceptions of the nature of pancreatic diabetes have led to different views on the function of insulin. Those who hold the view that diabetes results from unchecked overproduction of sugar by the liver see in insulin the agent which checks this excessive activity on the part of the liver; those who hold that diabetes results from impaired

ability of the tissues to utilise carbohydrate see in insulin the factor which restores this impaired ability to normal. The action of insulin in directly accelerating the utilisation of sugar by the peripheral tissues has been established beyond any doubt. The evidence that insulin acts directly on the liver is at best slender.[7 106] The view that it does so appears to be simply a special explanation of the observation that after administration of insulin to depancreatised animals the rate of formation of sugar by the liver is retarded. This observation appears to be more logically explained as the result of insulin removing the necessity for a compensatory rise of blood-sugar and thus allowing the rate of sugar formation by the liver to decrease to normal levels.

DYNAMIC EQUILIBRIUM OF THE BLOOD-SUGAR

A brief survey has now been made of some of the main phenomena of carbohydrate metabolism. Considered by itself each phenomenon is complicated, and its significance in relation to metabolism as a whole is often not apparent. But throughout the whole of normal and abnormal carbohydrate metabolism runs the recurring theme of variations in the head of pressure of blood-sugar, and by this theme changes in function of the different organs can be correlated and can be seen to be part of an ordered and useful plan. It is appropriate at this stage to attempt this correlation by expressing the observations we have been considering as an inclusive theory.

It is suggested that the height of the blood-sugar level is the essential mechanism determining the rate of carbohydrate utilisation by the tissues, and that the head of pressure of sugar in the blood is adjusted to that level which, in the particular circumstances, ensures, or comes nearest to ensuring, an adequate rate of carbohydrate utilisation. When the ability of the tissues to use carbohydrate is impaired, as by deficiency of insulin, impairment of insulin action, or lack of oxygen, the head of pressure of blood-sugar is raised, thereby facilitating the ability of the tissues to use sugar. When the ability of the tissues to use carbohydrate is restored or increased, the head of pressure of blood-sugar is adjusted to lower levels and excessive utilisation of carbohydrate avoided. Thus the head of pressure of sugar in the blood is adjusted at any particular time to the needs of the tissues. The liver is the agent of this adjustment. When the needs of the tissues are fully satisfied, the liver stores blood-sugar as glycogen; when the needs of the tissues are not satisfied, the liver secretes sugar and thus raises the head of pressure of blood-sugar. If the demands of the tissues are great, sugar is secreted at such a rate that the hepatic stores of glycogen are rapidly depleted and the liver is driven to form new sugar from protein and, possibly, fat. The liver is influenced in these reactions by factors secreted by the anterior lobe of the pituitary gland. When these are present in excess, the rate of breakdown of liver-glycogen and formation of sugar from non-carbohydrate sources is accelerated; when they are absent, these processes are retarded. The secretion of these pituitary factors increases in proportion as the needs of the tissues for carbohydrate are unsatisfied.

The facts at present available suggest that the ability to utilise carbohydrate is inherent in the tissues, and that this utilisation is facilitated by insulin and retarded by factors secreted by the anterior-pituitary gland. The efficiency and sensitivity of these mechanisms indicate that the unvarying maintenance of a concentration of sugar in the blood adequate for the needs of the tissues is a point of vital importance in the economy of the body. It is difficult to believe that a mechanism for such rapid and sensitive adjustment of the blood-sugar level could be necessitated by the needs of such relatively robust structures as muscle, which contain large reserves of carbohydrate and can continue to function for a considerable time, even when totally deprived of their blood-supply. It is suggested that the object of this efficient and sensitive mechanism is to ensure to the central nervous system a supply of sugar adequate for its needs. So far as is known, the brain utilises only carbohydrate,[71a] it contains little or no reserves of carbohydrate,[71b] and consciousness depends on an adequate supply of blood-sugar; it is as sensitive to deprivation of carbohydrate as it is to deprivation of oxygen. The theory may now be illustrated by various examples.

In starvation [108] the liver supplies sufficient sugar to the blood to maintain the blood-sugar constant. To do this the liver forms sugar from non-carbohydrate sources, and this process is revealed by increased excretion of endogenous nitrogen in the urine and by the appearance of ketonuria. The new formation of carbohydrate is facilitated by increased secretion of the anterior-pituitary gland, which also economises the utilisation of blood-sugar by retarding the action of insulin in the peripheral tissues. After some days of starvation the metabolic rate has fallen considerably, and as a consequence the demands of the tissues for carbohydrate from the liver are reduced. The formation of sugar by the liver from non-carbohydrate sources therefore diminishes, as is shown by the fall in urinary excretion of nitrogen and by the disappearance of ketonuria. The mechanism of the fall in metabolic rate is not understood.

In phloridzin poisoning the head of pressure of blood-sugar tends to sink below that adequate for the needs of the body. The liver responds by pouring sugar into the blood, which is first derived from the store of liver-glycogen and later from non-carbohydrate sources. Secretion of the anterior-pituitary gland occurs which retards peripheral utilisation and expedites new formation of sugar.

On injection of insulin into a normal animal the removal of sugar to the peripheral tissues, especially the muscles, is increased and the needs of the tissues are satisfied. The liver is no longer called on to secrete glucose, and as a result of this and the increased rate of peripheral removal the blood-sugar sinks. The fall of the head of pressure of blood-sugar in turn retards peripheral removal of sugar. Persistence of the blood-sugar at hypoglycæmic levels is prevented by secretion of adrenaline, stimulating hepatic glycogenolysis, and it is possible that the object of this emergency secretion is to restore an adequate supply of sugar to the brain, which, unable to store glucose even under the action of insulin, cannot survive long periods of hypoglycæmia.

In pancreatic diabetes the tissues, owing to lack of insulin, cannot utilise carbohydrate sufficiently rapidly for their needs. In an attempt to accelerate the utilisation the liver pours sugar into the blood until the head of pressure of blood-sugar reaches levels which either satisfy the needs of the tissues or cannot be increased. Since the demand for sugar is great, the store of liver-glycogen is rapidly exhausted and, to maintain the flow of sugar into the blood, the liver is driven to manufacture sugar from non-carbohydrate materials. The concomitant increased secretion by the pituitary gland facilitates the new formation of sugar by the liver but at the same time retards still further the utilisation of glucose by the tissues. If now the pituitary gland is removed, the formation of sugar from non-carbohydrate materials

is greatly reduced, and ketone formation diminishes with the result that the danger of fatal ketosis becomes remote. At the same time the retardation of peripheral sugar utilisation is removed, and in consequence the blood-sugar is more adequately utilised. For these reasons the hypophysectomised depancreatised dog, although it still suffers from diabetes in an attenuated form, will eke out its existence for several months.

The mechanism of pancreatic diabetes cannot be left without reference to Allen's classical work upon which the "under-nutrition treatment" of human diabetes was based.[5] He showed that in dogs from which sufficient pancreas had been removed to render them on the verge of diabetes overfeeding precipitated

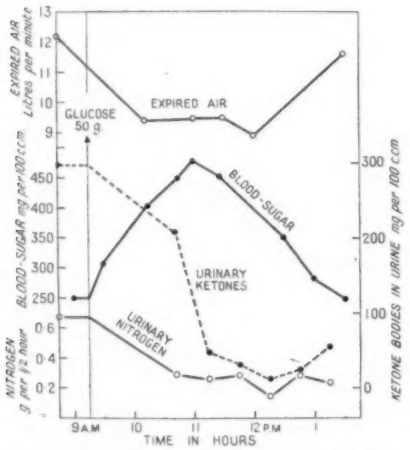

FIG. 6—The effect of ingestion of 50 g. of glucose in an untreated diabetic patient. It will be seen that, as the blood-sugar rises, the excretion of nitrogen and ketones in the urine falls.[59]

diabetes, whereas with underfeeding diabetes did not develop. The islets of Langerhans in the pancreas remaining in the dogs made diabetic by overfeeding showed typical degeneration.[6] Young has produced permanent diabetes [140] and similar lesions of the pancreas in normal dogs [112] by injecting anterior-pituitary extracts. It is suggested that in Allen's partially depancreatised dogs the high needs of the tissues for sugar, consequent upon overfeeding, called for more insulin than was available from the pancreatic remnant. Consequently the needs of the tissues for sugar were relatively unsatisfied, and in an attempt to remedy this the blood-sugar was raised to high levels and new formation of carbohydrate by the liver was accelerated. To facilitate this process, pituitary factors were secreted in excess and secondarily produced the degeneration of the islet cells, with the result that ultimately permanent diabetes developed. By keeping these dogs in a state of chronic undernutrition this unfavourable sequence of events can be avoided.

The clinical study of human diabetes provides numerous examples of the dynamic equilibrium of the blood-sugar. The two following examples will suffice as illustrations. It is a well-known clinical observation that in diabetes mellitus the blood-sugar level rises spontaneously during the night,[54] and, if the patient is receiving insulin during the day, this rise is by contrast all the more striking. During the day relatively adequate utilisation of carbohydrate by the tissues is ensured by the dietary carbohydrate and the insulin which the patient is receiving. In the fast between supper and breakfast the action of the injected insulin wanes, with the result that the ability of the tissues to utilise carbohydrate diminishes, and as a consequence the liver is stimulated to pour sugar into the blood and to increase the head of pressure of sugar in the blood. This spontaneous rise of blood-sugar can be prevented either completely or partially by measures which promote utilisation of sugar by the tissues during the night, such as nocturnal injections of insulin, exercise, or, in favourable circumstances, a carbohydrate meal at midnight before the rise has set in.

The beneficial effect of raising the blood-sugar in a human diabetic patient is well shown by the following example.[58]

A young untreated female diabetic was admitted with severe ketosis. She was given quantities of water to drink and frequent urine specimens were obtained. When the excretion of ketone bodies and nitrogen in the urine samples had reached a constant level, the patient was given 50 g. of glucose by mouth, but not any insulin. With the consequent rise of blood-sugar the ketonuria and excretion of urinary nitrogen diminished; but, as the blood-sugar fell, the ketonuria and urinary nitrogen excretion rose again (fig. 6).

It is a well-established clinical observation that ketonuria increases with the approach of diabetic coma and diminishes as this danger recedes, and recently Gray has shown that there is a similar change in ketonæmia.[50] It appears, therefore, that with the rise of blood-sugar the severity of the diabetes became less, but with the fall of blood-sugar the severity again increased. The explanation of this sequence of events seems to be as follows. As a consequence of the diminished ability of the tissues to use carbohydrate the liver, in an attempt to compensate this disability, poured sugar into the blood and hyperglycæmia resulted. But the head of pressure of sugar in the blood achieved by the liver was insufficient to accelerate utilisation of sugar by the tissues to a degree which satisfied their needs. As a consequence the demands on the liver continued, with the result that the formation of sugar from non-carbohydrate sources proceeded rapidly and was manifested by ketonuria and increased excretion of nitrogen in the urine. At this stage the patient received the glucose. With the consequent rise of blood-sugar the tissues received, and therefore used, more carbohydrate, the demands on the liver decreased, and consequently the new formation of sugar by the liver diminished. This was shown by a fall in ketonuria and urinary nitrogen. With the subsequent fall of the blood-sugar the original state re-established itself. The suggestion follows that the reason why a diabetic passes into diabetic coma is primarily because he cannot raise his blood-sugar high enough to ensure adequate utilisation of carbohydrate; for, if this object were attained, the excessive metabolism of protein and fat would diminish and ketosis would not develop. This suggestion is not incompatible with clinical experience, for it is known that, as a result of giving glucose and insulin, the blood-sugar level after recovery from coma may be higher than when coma was present; nor is it uncommon to see patients up and about and well with blood-sugar values at levels higher than those found in many comatose patients.

CYANOSIS CAUSED BY SULPHONAMIDE COMPOUNDS

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CYANOSIS developing during the course of treatment with drugs of the sulphonamide group has been found by Colebrook and Kenny (1936), Paton and Eaton (1937), Discombe (1937), Wendel (1938), Gley (1937), and others to be due to the conversion of part of the circulating hæmoglobin to sulphæmoglobin or to methæmoglobin. Several observers have, however, reported its development in cases where no alteration of the blood pigment could be detected spectroscopically, and where there was no change in the oxygen-carrying power of the blood (Colebrook and Purdie 1937, Marshall and Walzl 1937, Cheesley 1938). By way of explanation, some of them have postulated the formation of a coloured aniline derivative in the blood-stream (Young and Wilson 1926–27, Ottenberg and Fox 1938, Marshall and Walzl 1937).

During an extensive clinical use of *p*-aminobenzenesulphonamide and 2-*p*-aminobenzenesulphonamidopyridine we have found that cyanosis of varying intensity has been a frequent symptom, but we have always been able to account for it either from the clinical state of the patient or by careful spectroscopic examination of the blood. In cases treated with *p*-aminobenzenesulphonamide the pigment may be either methæmoglobin or sulphæmoglobin but in our experience is more frequently the latter. On the other hand, the pigment formed during treatment with 2-*p*-aminobenzenesulphonamidopyridine is practically always methæmoglobin. Of 32 cases of pneumonia treated with this drug methæmoglobin was detected in the blood of 25, and no case of sulphæmoglobinæmia developed spontaneously, despite the fact that no special precautions were taken to avoid purgation or sulphur-containing foods.

With the usual type of clinical spectroscope the differentiation between sulphæmoglobin and methæmoglobin is not always easy, because the characteristic absorption bands of both lie in the same vicinity at the red end of the spectrum. The sulphæmoglobin band occupies the wave-lengths from 615 μμ to 630 μμ, whereas that of methæmoglobin occupies the wave-lengths from 625 μμ to 655 μμ. It is, however, of some importance from the prognostic point of view that the differentiation between the two pigments should be made, because cyanosis due to sulphæmoglobin lasts for several weeks, whereas that due to methæmoglobin remains only a few days. In this investigation several types of spectroscopes were employed. It was found that one of small dispersion was the most suitable for detecting absorption bands at the red end of the spectrum. For the accurate measurement of the position of an absorption band a large-model Hilger constant-deviation spectrometer was used. Quantitative estimations of the absorption of light were made with this instrument together with a Nutting photometer. In some experiments band positions were compared with the Hartridge reversion spectroscope.

In the course of the investigation it became evident that for accurate spectroscopic examination of the blood, particularly for the presence of methæmoglobin, two precautions are necessary:—

(1) The blood must be laked with a small volume of water (not more than 1 in 5) so that the pigment may be in a concentrated solution.

(2) The specimen should be examined as soon after withdrawal as possible.

Table I shows the percentage of methæmoglobin which must be present in a mixture with oxyhæmoglobin before its absorption band becomes visible to the eye. These figures were obtained by examining the spectrum through two absorption cells of equal depth (0·5 cm.), one cell containing oxyhæmoglobin and the other methæmoglobin. By varying the proportion of methæmoglobin and oxyhæmoglobin so that the percentage of methæmoglobin was reduced while the total content of blood pigment in the two cells remained constant, the lowest percentage of methæmoglobin which could be detected was determined for different dilutions of blood. It will be seen that in a 1 in 50 dilution of blood the band of methæmoglobin appeared only when 50 per cent. or more of the total pigment was present as methæmoglobin, but that this critical limit was reduced as the strength of the hæmoglobin solution was increased. It will be obvious therefore that, unless the blood is laked with only a small amount of water (not more than 1 in 5) or is examined in a layer several centimetres thick, the presence of methæmoglobin may easily be missed.

TABLE I—METHÆMOGLOBIN

Dilution of blood	Minimal concentration of methæmoglobin producing visible absorption (per cent.)	—
1–50	50	Faint line
1–20	30	
1– 5	10	

TABLE II—SULPHÆMOGLOBIN

Dilution of blood	Minimal concentration of sulphæmoglobin producing visible absorption (per cent.)	—
1–50	10	Faint line
1–20	4	
1–10	2	Well-marked line
1– 5	0·5	

The same thing is true if a considerable time elapses between the withdrawal of blood and its spectroscopic examination. Fig. 1 shows graphically the absorption coefficients measured at 634 μμ at intervals after withdrawal of a sample of blood from a case of methæmoglobinæmia. The density of the characteristic band diminishes rapidly; in cases where the amount is not large it may be entirely absent in twelve hours. This is probably due to a gradual increase in the pH of the blood, for the characteristic band of methæmoglobin is well seen only in a neutral or acid solution.

These precautions are not so essential in the case of sulphæmoglobin. Table II shows that a 10 per cent concentration of this pigment can be detected in dilutions of blood as low as 1 in 50, and that in a 1 in 5 dilution a concentration of 0·5 per cent. gives an easily visible line; whereas fig. 1 shows that even thirty hours after the withdrawal of blood from a patient with sulphæmoglobinæmia there is no alteration in the density of the band at 625 μμ.

These observations suggest that the number of cases of cyanosis reported as developing during

sulphonamide treatment, without demonstrable sulphæmoglobinæmia or methæmoglobinæmia and without obvious cause, might be considerably reduced if samples of blood were examined promptly and in

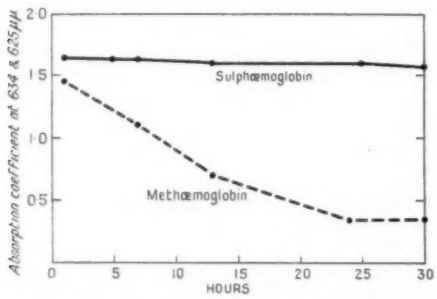


FIG. 1—The variation in the absorption coefficients in the same sample of blood from a case of sulphæmoglobinæmia and from a case of methæmoglobinæmia. The density of the band diminished rapidly in the case of methæmoglobin but remained unchanged in the case of sulphæmoglobin.

concentrated solution, and that it may be unnecessary to speculate on the possibility of any coloured derivative of aniline being the causal agent of the symptom. Wendel (1938), employing a technique somewhat similar to ours, has reported that he can demonstrate the presence of methæmoglobin in every case receiving sulphonamide where the blood concentration of the drug is over 4 mg. per 100 c.cm., and our experience agrees with this observation.

TREATMENT OF CYANOSIS

Although the onset of cyanosis is usually without serious significance, it is alarming and may have a disturbing psychological effect on the patient and his relations. Further, as Discombe (1937) has pointed out, in conditions of severe anæmia or in serious pulmonary disease, such as lobar pneumonia, a reduction in the oxygen capacity of the blood, consequent on the development of methæmoglobinæmia or of sulphæmoglobinæmia, may be sufficient to cause dangerous anoxæmia and thus aggravate considerably the disability of the patient. Any method of prevention or treatment of this symptom, therefore, would be a welcome adjunct where the prolonged administration of drugs of the sulphonamide group is necessary. The use of methylene-blue in the treatment of methæmoglobinæmia, originally suggested by Hauschild (1936), has been advocated by Wendel (1937) and favourably reported on by Hartmann et al. (1937); although it constitutes a therapeutic measure of some importance, its scope in the prevention and treatment of the various abnormalities of blood pigment produced by sulphonamides has not been fully investigated. We decided, therefore, to try to assess its therapeutic value in the treatment of methæmoglobinæmia and sulphæmoglobinæmia.

Blood for examination was prepared in the following way: 2 c.cm. of blood was made up to 10 c.cm. with distilled water, and 1 c.cm. of saponin solution was added and the mixture centrifuged at 3000 revolutions a minute. Quantitative estimations of methæmoglobin were made spectrophotometrically. The absorption coefficient of each sample of blood was measured throughout the red end of the spectrum at intervals of 5 μμ. By comparing these at the wavelength where the absorption band is at its maximal density (634 μμ for methæmoglobin and 625 μμ for sulphæmoglobin) it was possible to represent graphically variations in the methæmoglobin and sulphæmoglobin content of the blood.

METHÆMOGLOBINÆMIA

In the following cases of pneumonia methæmoglobinæmia developed during treatment with 2-*p*-aminobenzenesulphonamidopyridine and the effect of methylene-blue is illustrated.

CASE 1.—A man, aged 38, was admitted suffering from lobar pneumonia with involvement of the right middle lobe. He was given 2-*p*-aminobenzenesulphonamidopyridine in doses of 6 g. daily. Cyanosis due to methæmoglobinæmia appeared on the second day of treatment and was intense on the third day. Methylene-blue 350 mg. was then administered by intravenous injection. Within ten minutes the leaden-blue colour of the mucous membrane and ears had given place to a bright healthy pink, and no methæmoglobin could be detected in the blood. Methæmoglobinæmia did not recur, although treatment with the drug was continued till the sixth day (fig. 2).

CASE 2.—A man, aged 42, was admitted to hospital suffering from lobar pneumonia involving the right lower lobe. He received daily 6 g. of 2-*p*-aminobenzenesulphonamidopyridine in divided doses of 1 g. every four hours. The blood on the third day showed the presence of methæmoglobin, and on the fourth day cyanosis was obvious. After the intramuscular injection of 400 mg. of methylene-blue the methæmoglobinæmia disappeared. Treatment with the sulphonamide was not interrupted, and methæmoglobinæmia reappeared on the following day. A daily dose of 1 g. of methylene-blue was then given by mouth for the next three days, and methæmoglobin disappeared from the blood and did not recur (fig. 3).

CASE 3.—A youth of 18 was admitted suffering from lobar pneumonia with involvement of the left

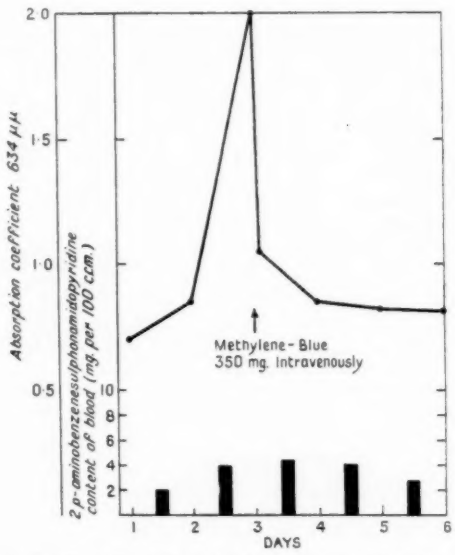


FIG. 2—The effect of a single intravenous injection of methylene-blue in causing the disappearance of methæmoglobin in case 1.

lower lobe. He did not respond to the administration of the usual daily dose of 6 g. of 2-*p*-aminobenzenesulphonamidopyridine, and the estimation of the amount of the drug in the blood-stream revealed

very low values. It was assumed that the drug was poorly absorbed, and the dose was increased by 2 g. daily with a consequent increase in the concentration of the drug in the blood. Coincidentwith this, methæmoglobinæmia appeared, and three days later cyanosis was intense. Methylene-blue 150 mg. was injected intravenously and caused such a rapid disappearance of the methæmoglobin that it could not be detected in the blood five minutes after the injection (fig. 4).

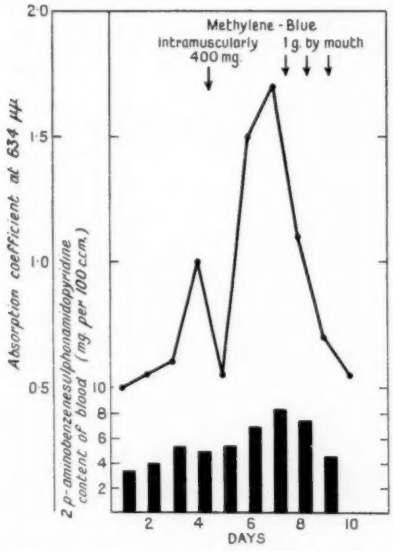


FIG. 3—The action of methylene-blue by intramuscular injection and by mouth in case 2.

CASE 4.—A man, aged 38, was admitted to hospital suffering from lobar pneumonia. Physical examination showed consolidation of the right lower lobe. He received 2-*p*-aminobenzenesulphonamidopyridine in doses of 6 g. daily. Cyanosis developed on the third day, and methæmoglobin was demonstrated in the blood. This increased in intensity, and on the ninth day 360 mg. of methylene-blue was administered by intramuscular injection. On the following day the cyanosis had entirely disappeared, and methæmoglobin could no longer be detected in the blood. The administration of the sulphonamide was continued. Methæmoglobin reappeared on the twelfth day, and on the fourteenth day cyanosis was again obvious. He then received 1 g. of methylene-blue daily by mouth for two days, and at the end of that time the cyanosis had disappeared entirely. The blood-iron was estimated daily by the method of Wong and remained constant. It must be assumed, therefore, that the disappearance of the methæmoglobin was due to conversion of this pigment to hæmoglobin and not to its destruction or excretion. Fig. 5 shows graphically the variation in the absorption coefficient of the blood at 634 μμ throughout the period of investigation.

It can hardly be argued that the results obtained in these cases were due to a natural and spontaneous remission in the severity of the cardinal symptom, because we had previously found that, when methæmoglobinæmia developed during treatment with 2-*p*-aminobenzenesulphonamidopyridine, the pigment could be detected in the blood four or five days after all trace of the drug had disappeared from the

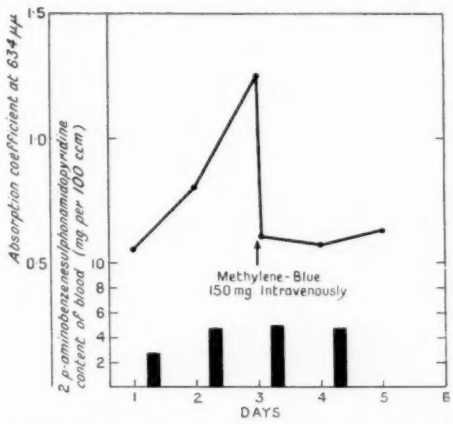


FIG. 4—The effect on the absorption coefficient at 634 μμ of 150 mg. of methylene-blue given by intravenous injection in case 3.

blood-stream. It is justifiable, therefore, to conclude that methylene-blue actively converts methæmoglobin into hæmoglobin.

It is of interest to record that methylene-blue has a similar action on the methæmoglobinæmia produced by the administration of nitrites. If 100 mg. of sodium nitrite per kg. of body-weight is injected intravenously into a rabbit, well-marked methæmoglobinæmia appears within half an hour. If at this stage an intravenous injection of 10 mg. per kg. of methylene-blue is given, methæmoglobin disappears from the circulation within five to ten minutes (fig. 6*a*). Furthermore, the production of methæmoglobinæmia by sodium nitrite can be prevented by the simultaneous injection of methylene-blue (fig. 6*b*). The mode of action of the dye, which

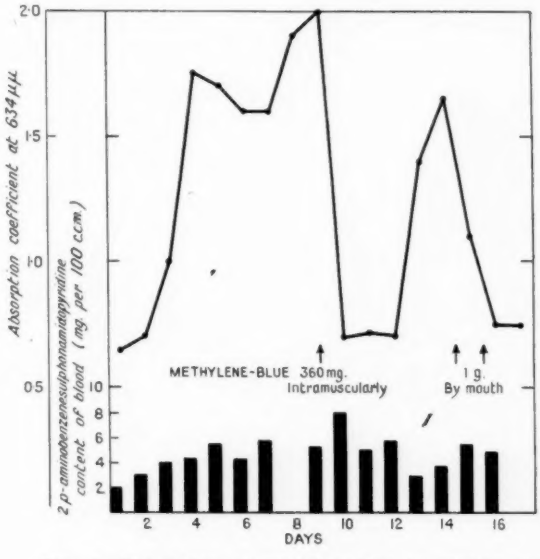

Absorption coefficient at 634 μμ
2 p-aminobenzenesulphonamidopyridine content of blood (mg per 100 c.c.m.)
METHYLENE-BLUE 360 mg. Intramuscularly
1 g. By mouth
DAYS

FIG. 5—The action of methylene-blue in causing the disappearance of methæmoglobin from the blood-stream when given by intramuscular injection and by mouth in case 4.

in the tissues is reduced to the leuco compound, is presumably one of oxidation-reduction, the ferric iron of hæmoglobin being altered to the ferrous state.

The dye, as we have shown, is active when given by mouth. It is also slowly excreted. After the oral administration of 1 g. it can be detected in the urine for three or four days. A prolonged effect can

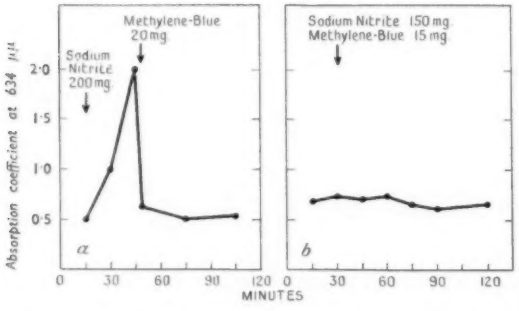


FIG. 6—(*a*) The effect of methylene-blue in causing the disappearance of methæmoglobinæmia induced by the injection of sodium nitrite in a rabbit. (*b*) The effect of the simultaneous administration of methylene-blue and sodium nitrite. No methæmoglobin appeared in the blood-stream.

therefore be obtained by giving it by mouth in divided doses several times a day. In view of its action in preventing methæmoglobinæmia, it is well worth while considering the advisability of giving it as a routine along with 2-*p*-aminobenzenesulphonamidopyridine in the treatment of pneumonia and other infective conditions.

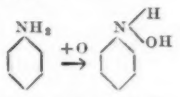
SULPHÆMOGLOBINÆMIA

In view of the results obtained in methæmoglobinæmia, the efficacy of methylene-blue was tried out in two cases of sulphæmoglobinæmia which developed after the administration of *p*-aminobenzenesulphonamide. The dye was given intravenously and by mouth but was without effect. Fig. 7 shows that when 200 mg. of methylene-blue was injected intravenously, the absorption coefficient at 625 μμ remained constant throughout the period of observation. The oral administration of 0·5 g. thrice daily over a period of three days was also ineffective in altering the abnormal blood pigment.

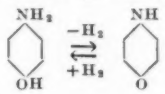
We found also that methylene-blue did not prevent the development of sulphæmoglobinæmia when administered along with *p*-aminobenzenesulphonamide. Two volunteers were given 1 g. of the sulphonamide three times daily, 4 g. of confection of sulphur each morning, and 1 g. of methylene-blue daily in three divided doses. In both cases the typical band of sulphæmoglobin appeared in the blood within forty-eight hours and was dense on the fourth day.

The mode of formation of sulphæmoglobin after the administration of sulphonamides has not been satisfactorily explained. Archer and Discombe (1937) have reported experiments which suggest that sulphonamide, by virtue of the C_6H_5N group, sensitises hæmoglobin to the action of hydrogen sulphide. We have been unable to find any evidence of a sensitising effect in experiments in vitro, though we have confirmed their results regarding the ease with which sulphæmoglobinæmia can be induced in man when sulphur is given along with *p*-aminobenzenesulphonamide, and we have found that the same thing may happen if 2-*p*-aminobenzenesulphonamidopyridine and sulphur are administered together.

According to Ellinger (1920) and Lipshutz (1920) aniline derivatives are oxidised in the blood to phenylhydroxylamine—



and Gley (1937) has suggested that it is this compound which is responsible for the formation of methæmoglobin and, in the presence of sulphide, of sulphæmoglobin. He has shown that in vitro the addition to blood of a substance containing the hydroxylamine group results in the formation of methæmoglobin, but that, if a trace of hydrogen sulphide is present, sulphæmoglobin is formed. Rimington (1939), however, thinks it unlikely that hydroxylamine is the methæmoglobin-forming substance, because of the ease with which it is oxidised in the tissues to azoxybenzene, and believes that it is the formation of *p*-aminophenol which is the important factor, because this substance is readily oxidised in the tissues to *p*-iminoquinone—



He points out, further, that this oxidation is reversible, and accordingly *p*-aminophenol will be able to form many times its equivalent of methæmoglobin.

That this is a possible explanation of the formation of sulphæmoglobin as well is shown by the following experiment:—

To 5 c.cm. of laked blood 3 drops of a saturated solution of *p*-aminophenol was added. Spectroscopic examination at the end of ten minutes showed the presence of methæmoglobin.

To another 5 c.cm. of the same laked blood 3 drops of a weak solution of hydrogen sulphide was added; in ten minutes no alteration in the blood pigment had taken place.

To a third 5 c.cm. of the same laked blood 3 drops of a weak solution of hydrogen sulphide and 3 drops of *p*-aminophenol solution were added. At the end of five minutes a dense band of sulphæmoglobin was present.

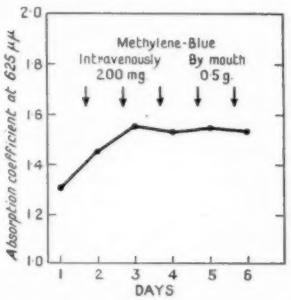


FIG. 7—The action of methylene-blue by intravenous injection and by mouth in an established case of sulphæmoglobinæmia. No alteration in density of the absorption band took place.

It should be noted that the ease with which substances with a free amino group form sulphæmoglobin in the presence of sulphide is peculiar, because other agents which in vitro alter hæmoglobin to methæmoglobin—e.g., sodium nitrite, potassium ferricyanide, and potassium permanganate—if added to blood containing hydrogen sulphide, produce sulphæmoglobin much more slowly.

It is possible, therefore, to explain the specific action of aniline derivatives in forming sulphæmo-

globin if we assume that they are changed in the tissues to *p*-aminophenol, which leads primarily to the formation of methæmoglobin; but that, if sulphide is present during this process, the sulphide combines with the iron of hæmoglobin when in the ferric state and gives rise to sulphæmoglobin. If this explanation is correct, the fact that methylene-blue will not, as we have shown, prevent sulphæmoglobinæmia suggests that the dye does not really inhibit the formation of methæmoglobin but simply changes it fairly rapidly back to hæmoglobin, so that the abnormal pigment cannot accumulate in the circulation.

CONCLUSIONS

(1) When examining blood spectroscopically for methæmoglobin, it is essential that the sample should be laked with only a small volume of water and examined soon after withdrawal. Otherwise the presence of the pigment may not be detected.

(2) In cyanosis developing during the therapeutic use of 2-*p*-aminobenzenesulphonamidopyridine and *p*-aminobenzenesulphonamide, where there is no other obvious cause, careful spectroscopic examination of the blood always demonstrates the presence of either methæmoglobin or sulphæmoglobin.

(3) In methæmoglobinæmia, whether produced by 2-*p*-aminobenzenesulphonamidopyridine or by sodium nitrite, methylene-blue is effective in causing the rapid disappearance of the cyanosis by converting methæmoglobin to hæmoglobin.

(4) The dye is active when given intravenously, intramuscularly, or by mouth.

(5) It is suggested that the routine employment of methylene-blue in conditions calling for the prolonged administration of 2-*p*-aminobenzenesulphonamidopyridine may be a useful measure in preventing cyanosis.

(6) Methylene-blue has no effect in preventing or modifying the cyanosis of sulphæmoglobinæmia.

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"... We know that a mixture of blood is good for the race. A periodic stirring of the cauldron mixes the ingredients and brings out qualities of mind and body which tend to stagnate, if left undisturbed too long. The sack of Constantinople was followed by the renaissance. So, I hope, may the evacuation of our cities be followed by a re-awakening of rural England, and the dawn of a new era of living planned on healthier and more spacious lines than those to which so many of our countrymen have become accustomed, for there is little doubt that many of the refugees will never return."—Dr. W. A. LETHEM, medical officer at the Ministry of Health, speaking at the Royal Sanitary Institute Health Congress at Scarborough on July 5, 1939.

EFFECT OF SULPHANILAMIDE ON THE BLOOD IN SCARLET FEVER

BY JANE O. FRENCH, M.D. Glasg., D.P.H., D.R.C.O.G.

ASSISTANT MEDICAL OFFICER IN THE CITY OF COVENTRY PUBLIC HEALTH DEPARTMENT; LATE RESIDENT ASSISTANT PHYSICIAN AT RUCHILL FEVER HOSPITAL, GLASGOW

AMONG all the enthusiastic and conflicting reports on the value of the sulphanilamide class of drugs one fact stands out clearly: unpleasant and even fatal reactions have followed their use. These effects are very variable in their nature, incidence, and severity. Blood disorders take a high place among the unfortunate sequelæ of sulphanilamide therapy. Ten cases of agranulocytosis have been recorded: Plumer (1937), Borst (1937), Young (1937), Model (1937), Schwartz, Garvin, and Koletsky (1938), and Berg and Holtzman (1938) have reported fatal cases, and Jennings and Southwell-Sander (1937), Touraine, Durel, and Baudouin (1937), and Allen and Short (1938) reported cases in which recovery ensued. Some observers have noted a depression in the leucocyte count not amounting to agranulocytosis (Johnston 1938). Several cases of acute hæmolytic anæmia following sulphanilamide therapy have been recorded (Harvey and Janeway 1937, Kohn 1937, Long and Bliss 1937, Wood 1938) and three of non-hæmolytic anæmia (Jennings and Southwell-Sander 1937).

The effect of sulphanilamide on the leucocytes has as yet received relatively little attention either from the experimental or the clinical aspect. Marshall, Cutting, and Emerson (1938) found no change in the blood-picture of four rabbits and two dogs after the administration of sulphanilamide. Bigler, Clifton, and Werner (1938), who investigated the leucocyte response to sulphanilamide in 33 patients before, during, and after treatment, concluded that sulphanilamide seemed to cause a depression of the white blood-cells, even to a point at which leucopenia developed, but that agranulocytosis did not develop with this depression of leucocytes. Britton and Howkins (1938) investigated the action of sulphanilamide on the leucocytes of 50 ambulant female patients. Leucocyte counts of less than 5000 per c.mm. were recorded in 18 of these, and the authors considered that there was a polymorphonuclear leucopenia in 46 per cent. of their cases. The lymphocytes remained normal throughout, but monocytosis developed in 44 per cent. of the patients and eosinophilia in 20 per cent. Campbell (1938) found no change in the erythrocyte, hæmoglobin, and total leucocyte counts in the cases investigated by him. He found that moderate doses of sulphanilamide stimulated a slight rise in the reticulocyte level, which is not necessarily associated with anæmia or leucopenia.

Method of Investigation

During 1937 and 1938 a controlled series of 340 cases of scarlet fever was treated with sulphanilamide at Ruchill Fever Hospital, Glasgow. Half of the patients received sulphanilamide treatment, while the remaining 170 were not so treated, allocation to each form of treatment being determined solely by order of admission to hospital. Observations were made on the blood-counts of patients in this series. It is not intended here to discuss the therapeutic effect of the substances used but merely to record the effect of sulphanilamide on the total blood-count and on the differential blood-count. Of the 444

leucocyte counts made approximately half, and of the 56 differential blood-counts 30, were in patients treated with sulphanilamide. The results of these investigations are described and discussed.

The amount of sulphanilamide given was large, and treatment was continued during the entire period of four weeks which constitutes the average time of detention of scarlet-fever patients in hospital. The dose was as follows:—

Patients 5 years of age or older were given 1 g. four-hourly—i.e., 5 g. daily—for the first fourteen days in hospital and then 1 g. thrice daily—i.e., 3 g. daily—for fourteen days. The average total dose was 112 g.

Patients under 5 years of age were given 0·5 g. four-hourly—i.e., 2·5 g. daily—for the first fourteen days in hospital and then 0·5 g. thrice daily—i.e., 1·5 g. daily—for fourteen days. The average total dose was 56 g.

Concentrated scarlet-fever antitoxin was given to any patient who was thought to require it, irrespective of whether that patient was going to have sulphanilamide or not. Of the 340 patients 269 were treated with serum. The average dose was 20 c.cm., the least 10 c.cm., and the greatest 40 c.cm. Of the patients receiving sulphanilamide 135 (79·4 per cent.) received serum, and of the controls 134 (78·8 per cent.) received serum. The patients showed an even distribution in respect of age-incidence, sex-incidence, and complications present on admission and developing later (French, to be published).

Results

The results recorded cannot be considered directly comparable with those of others who have made observations on the effect of sulphanilamide on the blood. The patients were all suffering from a condition which can per se cause a leucocytosis, and many had late complications which would tend to maintain that leucocytosis. No attempt was made to examine the blood of selected cases systematically; the leucocyte counts were made at random, and it was hoped that an even distribution in respect of treatment, day of illness, and other factors would result from this method of selection, as in fact it did. The counts relate to scarlet-fever patients at all stages of the disease within the first four weeks, and there are a few observations made on patients after that period. It will be observed later that the leucocyte counts in the latter group are higher than normal. These patients all had some complication responsible for their longer period of detention in hospital, and this complication probably caused the leucocytosis. The action of sulphanilamide on the blood in this series of cases can only be studied by comparing the sulphanilamide cases with the control cases at the same period of the illness. This was done and the results of the total leucocyte count, the differential leucocyte count, the red-cell count, and the percentage of hæmoglobin are shown.

TABLE I—TOTAL LEUCOCYTE COUNTS

—	Sulphanilamide group		Control group		Difference (per cent.)	Standard error of difference
	No.	Per cent.	No.	Per cent.		
Total leucocyte counts made	211	100	233	100	—	—
Highest recorded count per c.mm.	43,800		52,400		—	—
Lowest recorded count per c.mm.	5200		7400		—	—
Counts under 5000 per c.mm.	None		None		—	—
Counts between 5000 and 10,000 per c.mm.	34	16·1	22	9·4	6·7	3·170
Counts between 5000 and 10,000 per c.mm. in first week of illness—i.e., during period of high sulphanilamide dosage	15	23·0	5	6·3	16·7	5·912

TOTAL LEUCOCYTE COUNT

Table I shows the salient features of the observations on the total leucocyte count; fig. 1 the average leucocyte count at weeks in the form of a graph; and fig. 2 the average leucocyte count at three-day intervals in the form of a graph. There are some statistically significant differences leucocyte counts in the sulphanilamide evidence points to a white-cell count in amide. A much hi sulphanilamide grou and this difference first week of the illn expected in practically this depression of the leucopenia, the estimatio normal upper limit of 10,000 in a large majority of the cases inve

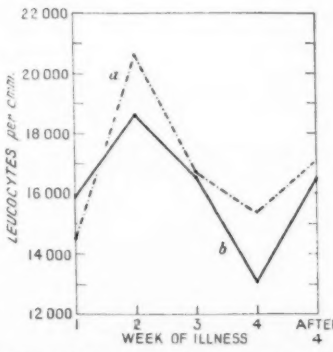

FIG. 1—Mean leucocyte count at weekly intervals in scarlet fever: (*a*) patients not treated ilamide; (*b*) patien nil-amide

DIFFERENTIAL LEUCOCYTE COUNT

Polymorphonuclear neutrophil leucocytes.—Since sulphanilamide is believed to have a toxic action on the bone-marrow, neutropenia was particularly sought for. When the polymorphonuclear neutrophil cells were less than 60 per cent. of all the white cells, this was considered to be below normal, and the following were the percentages in each group which gave this figure:—

Sulphanilamide cases	33·3 per cent.
Control cases	15·3 „
Difference	18·0 „
Standard error of difference	11·31 „

Although this difference is statistically insignificant, there appears to be some ground for the belief that sulphanilamide has a depressant action on the neutrophil polymorphs and hence on the bone-marrow.

Large and small lymphocytes.—Although variations in the number of the lymphocytes are usually relative and depend merely on the number of polymorph cells, absolute increase is not unknown. Attention was paid to the lymphocytes in the following manner. Cases in which the total leucocyte count was 10,000 or less per c.mm. were ignored, for in them any percentage increase in the lymphocytes was probably due to a diminished polymorph count. All cases in which the total leucocyte count was 10,000 or more

per c.mm., and in which the lymphocytes numbered 30 or more per cent., were considered to represent a true lymphocytosis. This was found in 1 case in the control group and in 7 in the sulphanilamide group. I do not know what is the significance of this finding, if indeed there is any. Some of these cases with polymorphonuclear neutrophil counts of less than 60 per cent. were included in those considered to have a neutropenia. If the condition was to be regarded as a lymphocytosis, this should not have been done, but it is difficult to know how it should be classified. Wylie (1929) found a constant increase in the percentage of small lymphocytes in scarlet fever up to the seventh day of illness. A brief summary of the counts showing lymphocytosis is given in table II.

Mononuclear leucocytes.—No significant change in the proportion of mononuclear leucocytes was observed in the cases examined. The upper limit of normality (7·5 per cent. of all white cells) was exceeded in 20 per cent. of counts in the control group and in 15·3 per cent. in the sulphanilamide group. The difference is 4·7 per cent. and the standard error of the difference 10·17.

Eosinophil leucocytes.—Of the control group 23·1 per cent. of those examined were found to have more than 4 per cent. of eosinophil leucocytes, the corresponding figure in the sulphanilamide group being 20 per cent. The difference is 3·1 per cent. and the standard error of the difference 11·01. The highest recorded eosinophil count was 16·5 per cent. in a man, aged 23, who was in the control group and was treated with serum. The count was recorded on the fifth day of a moderately severe uncomplicated attack of scarlatina simplex. Three days later the eosinophil count had dropped to 5·5 per cent. There was no history of asthma or other allergic manifestations.

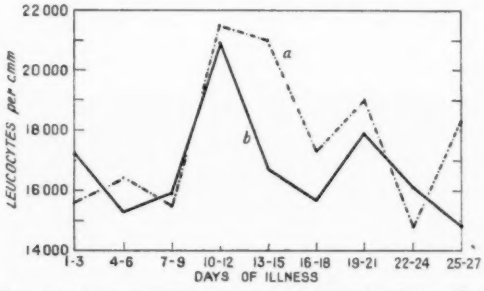

FIG. 2—Mean leucocyte count at three-day intervals in scarlet fever. For key see fig. 1.

TABLE II—CASES SHOWING LYMPHOCYTOSIS

—	Total white-cell count per c.mm.	Neutrophil polymorphs (per cent.)	Lymphocytes (per cent.)		
			Large	Small	Total
Case in control group ..	19,700	58·0	13·5	22·0	35·5
Cases in sulphanilamide group	11,200	60·5	11·0	21·0	32·0
	10,700	58·5	11·0	23·0	34·0
	10,300	51·0	7·0	37·5	44·5
	12,400	63·5	7·5	23·0	30·5
	18,300	58·0	3·5	32·0	35·5
	12,400	40·0	17·5	31·0	48·5
	10,500	59·5	9·5	25·0	34·5

RED-CELL COUNT

Sulphanilamide appeared to have a slightly depressant effect on the red blood-cells. The average counts recorded in each week of illness in the two groups are shown in table III.

HÆMOGLOBIN

Sulphanilamide was found to have no apparent effect on the hæmoglobin. The average readings recorded in each week of illness in the two groups are shown in table IV.

TABLE III—RED-CELL COUNTS IV—HÆMOGLOBIN

Week of illness	Red blood-cells per c.mm.		Hæmoglobin (Sahli) (per cent.)	
	Sulphanilamide group	Control group	Sulphanilamide group	Control group
1	5,180,000	5,320,000	101·0	97·4
2	4,090,000	5,323,000	90·1	95·3
3	4,893,000	4,490,000	91·6	86·0
4	4,958,000	5,315,000	97·0	87·0

Discussion

These observations show that sulphanilamide had little deleterious effect on any element of the blood except the polymorphonuclear leucocytes. In the patients treated with sulphanilamide a slight but constant depression of the total white-cell count was observed at all periods of scarlet fever, especially in the first week. Differential counts showed that this was due to a diminution in the neutrophil polymorphs. Although this depression never amounted to an actual leucopenia, it is easy to imagine that in a patient with a grave infection, in whom the marrow is already depressed, the administration of sulphanilamide may have the unfortunate effect of bringing about the serious state of agranulocytosis. It seems very significant that, in the sulphanilamide group, 23 per cent. of those examined in the first week of illness did not show a leucocytosis, whereas the corresponding figure in the control group was only 6·3 per cent. After the first week the occurrence of leucocytosis is too variable for its absence to have the same significance.

I am greatly indebted to Dr. W. M. Elliott, physician-superintendent of Ruchill Fever Hospital, for permission to publish these results.

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Concentrated scarlet-fever antitoxin was given to any patient who was thought to require it, irrespective of whether that patient was going to have sulphanilamide or not. Of the 340 patients 269 were treated with serum. The average dose was 20 c.cm., the least 10 c.cm., and the greatest 40 c.cm. Of the patients receiving sulphanilamide 135 (79·4 per cent.) received serum, and of the controls 134 (78·8 per cent.) received serum. The patients showed an even distribution in respect of age-incidence, sex-incidence, and complications present on admission and developing later (French, to be published).

Results

The results recorded cannot be considered directly comparable with those of others who have made observations on the effect of sulphanilamide on the blood. The patients were all suffering from a condition which can per se cause a leucocytosis, and many had late complications which would tend to maintain that leucocytosis. No attempt was made to examine the blood of selected cases systematically; the leucocyte counts were made at random, and it was hoped that an even distribution in respect of treatment, day of illness, and other factors would result from this method of selection, as in fact it did. The counts relate to scarlet-fever patients at all stages of the disease within the first four weeks, and there are a few observations made on patients after that period. It will be observed later that the leucocyte counts in the latter group are higher than normal. These patients all had some complication responsible for their longer period of detention in hospital, and this complication probably caused the leucocytosis. The action of sulphanilamide on the blood in this series of cases can only be studied by comparing the sulphanilamide cases with the control cases at the same period of the illness. This was done and the results of the total leucocyte count, the differential leucocyte count, the red-cell count, and the percentage of hæmoglobin are shown.

TABLE I—TOTAL LEUCOCYTE COUNTS

—	Sulphanilamide group		Control group		Difference (per cent.)	Standard error of difference
	No.	Per cent.	No.	Per cent.		
Total leucocyte counts made	211	100	233	100	—	—
Highest recorded count per c.mm.	43,800		52,400		—	—
Lowest recorded count per c.mm.	5200		7400		—	—
Counts under 5000 per c.mm.	None		None		—	—
Counts between 5000 and 10,000 per c.mm.	34	16·1	22	9·4	6·7	3·170
Counts between 5000 and 10,000 per c.mm. in first week of illness—i.e., during period of high sulphanilamide dosage	15	23·0	5	6·3	16·7	5·912

TOTAL LEUCOCYTE COUNT

Table I shows the salient features of the observations on the total leucocyte count; fig. 1 the average leucocyte count at weeks in the form of a graph; and fig. 2 the average leucocyte count at three-day intervals in the form of a graph. There are some statistically significant differences between the average total leucocyte counts in the control group and those in the sulphanilamide group, and all the available evidence points to a constant slight depression in the white-cell count in the cases treated with sulphanilamide. A much higher percentage of counts in the sulphanilamide group did not show a leucocytosis, and this difference was very obvious indeed in the first week of the illness, when leucocytosis might be expected in practically all instances. In no case did this depression of the white-cell count amount to a leucopenia, the estimations being well above the normal upper limit of 10,000 leucocytes per c.mm. in a large majority of the cases investigated.

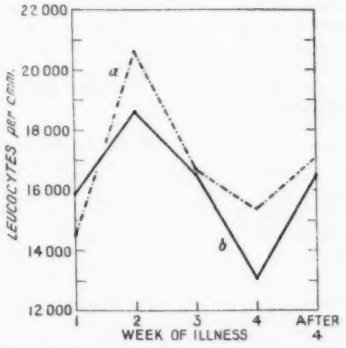

FIG. 1—Mean leucocyte count at weekly intervals in scarlet fever: (*a*) patients not treated with sulphanilamide; (*b*) patients treated with sulphanilamide.

DIFFERENTIAL LEUCOCYTE COUNT

Polymorphonuclear neutrophil leucocytes.—Since sulphanilamide is believed to have a toxic action on the bone-marrow, neutropenia was particularly sought for. When the polymorphonuclear neutrophil cells were less than 60 per cent. of all the white cells, this was considered to be below normal, and the following were the percentages in each group which gave this figure:—

Sulphanilamide cases	33·3 per cent.
Control cases	15·3 „
Difference	18·0 „
Standard error of difference	11·31 „

Although this difference is statistically insignificant, there appears to be some ground for the belief that sulphanilamide has a depressant action on the neutrophil polymorphs and hence on the bone-marrow.

Large and small lymphocytes.—Although variations in the number of the lymphocytes are usually relative and depend merely on the number of polymorph cells, absolute increase is not unknown. Attention was paid to the lymphocytes in the following manner. Cases in which the total leucocyte count was 10,000 or less per c.mm. were ignored, for in them any percentage increase in the lymphocytes was probably due to a diminished polymorph count. All cases in which the total leucocyte count was 10,000 or more

per c.mm., and in which the lymphocytes numbered 30 or more per cent., were considered to represent a true lymphocytosis. This was found in 1 case in the control group and in 7 in the sulphanilamide group. I do not know what is the significance of this finding, if indeed there is any. Some of these cases with polymorphonuclear neutrophil counts of less than 60 per cent. were included in those considered to have a neutropenia. If the condition was to be regarded as a lymphocytosis, this should not have been done, but it is difficult to know how it should be classified. Wylie (1929) found a constant increase in the percentage of small lymphocytes in scarlet fever up to the seventh day of illness. A brief summary of the counts showing lymphocytosis is given in table II.

Mononuclear leucocytes.—No significant change in the proportion of mononuclear leucocytes was observed in the cases examined. The upper limit of normality (7·5 per cent. of all white cells) was exceeded in 20 per cent. of counts in the control group and in 15·3 per cent. in the sulphanilamide group. The difference is 4·7 per cent. and the standard error of the difference 10·17.

Eosinophil leucocytes.—Of the control group 23·1 per cent. of those examined were found to have

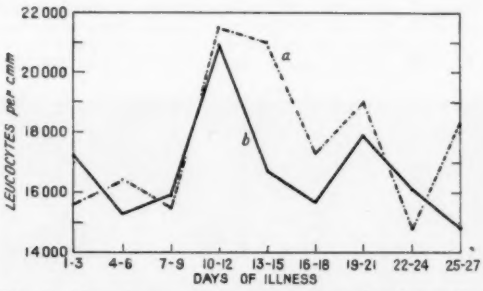

FIG. 2—Mean leucocyte count at three-day intervals in scarlet fever. For key see fig. 1.

more than 4 per cent. of eosinophil leucocytes, the corresponding figure in the sulphanilamide group being 20 per cent. The difference is 3·1 per cent. and the standard error of the difference 11·01. The highest recorded eosinophil count was 16·5 per cent. in a man, aged 23, who was in the control group and was treated with serum. The count was recorded on the fifth day of a moderately severe uncomplicated attack of scarlatina simplex.

TABLE II—CASES SHOWING LYMPHOCYTOSIS

—	Total white-cell count per c.mm.	Neutrophil polymorphs (per cent.)	Lymphocytes (per cent.)		
			Large	Small	Total
Case in control group ..	19,700	58·0	13·5	22·0	35·5
Cases in sulphanilamide group	11,200	60·5	11·0	21·0	32·0
	10,700	58·5	11·0	23·0	34·0
	10,300	51·0	7·0	37·5	44·5
	12,400	63·5	7·5	23·0	30·5
	18,300	58·0	3·5	32·0	35·5
	12,400	40·0	17·5	31·0	48·5
	10,500	59·5	9·5	25·0	34·5

Three days later the eosinophil count had dropped to 5·5 per cent. There was no history of asthma or other allergic manifestations.

RED-CELL COUNT

Sulphanilamide appeared to have a slightly depressant effect on the red blood-cells. The average counts recorded in each week of illness in the two groups are shown in table III.

HÆMOGLOBIN

Sulphanilamide was found to have no apparent effect on the hæmoglobin. The average readings recorded in each week of illness in the two groups are shown in table IV.

TABLE III—RED-CELL COUNTS IV—HÆMOGLOBIN

Week of illness	Red blood-cells per c.mm.		Hæmoglobin (Sahli) (per cent.)	
	Sulphanilamide group	Control group	Sulphanilamide group	Control group
1	5,180,000	5,320,000	101·0	97·4
2	4,090,000	5,323,000	90·1	95·3
3	4,893,000	4,490,000	91·6	86·0
4	4,958,000	5,315,000	97·0	87·0

Discussion

These observations show that sulphanilamide had little deleterious effect on any element of the blood except the polymorphonuclear leucocytes. In the patients treated with sulphanilamide a slight but constant depression of the total white-cell count was observed at all periods of scarlet fever, especially in the first week. Differential counts showed that this was due to a diminution in the neutrophil polymorphs. Although this depression never amounted to an actual leucopenia, it is easy to imagine that in a patient with a grave infection, in whom the marrow is already depressed, the administration of sulphanilamide may have the unfortunate effect of bringing about the serious state of agranulocytosis. It seems very significant that, in the sulphanilamide group, 23 per cent. of those examined in the first week of illness did not show a leucocytosis, whereas the corresponding figure in the control group was only 6·3 per cent. After the first week the occurrence of leucocytosis is too variable for its absence to have the same significance.

I am greatly indebted to Dr. W. M. Elliott, physician-superintendent of Ruchill Fever Hospital, for permission to publish these results.

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FRACTURED PATELLA TREATED BY EXCISION OF THE FRAGMENTS

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When Ralph Brooke advocated treatment of the fractured patella by excision of the fragments in 1937, the surgical world was startled. It caused a similar effect on Prof. Hey Groves, the editor of the *British Journal of Surgery*, for he travelled to see Brooke's actual patients and then, stimulated to study the matter with Prof. Whitnall, he wrote a note on the anatomy and mechanics of the patella confirming the soundness of the principle (Groves 1937). Since then Gordon Tippett (1937) and others have published successful cases.

This note gives details of my first five cases of fractured patella treated by excision of the fragments, and adds a short commentary on the method. My interest in the fractured patella was inspired in 1930 by my colleague Mr. A. J. Couzens, F.R.C.S., who had developed an effective technique for wiring and after-treatment. This wiring and postoperative care was satisfactory and patients walked home on the 14th day, but full function of the knee-joint was seldom completely regained. Various troubles were encountered—for instance, sinuses developed and the wire or plaited silk required removal; the fragments separated, or their position after being satisfactory became disturbed; the knee was occasionally stiff, for bony union was always tedious and uncertain and until it was attained vigorous muscular exercise and forcible measures to gain full movement were inadvisable. Flexion was generally limited, a degree of swelling persisted, and pain and fatigue were not uncommon.

When Brooke reported his convincing treatment by excision of the fragments, I adopted it, and the results have fulfilled the high expectations. The patients are restored to normal although their age in three cases was 72, 60 and 60. The patients were shown at a medical meeting and from their function it was not possible to detect the injured knee.

CASE-RECORDS

Case 1.—A man aged 72 sustained a fractured patella in a motor accident on Oct. 27, 1937. Operation on the 30th. Percaine spinal anæsthesia. A tourniquet was applied. Transverse incision over the gap between the fragments. Fragments found to be widely separated and the quadriceps tendon grossly shredded. Fragments excised and quadriceps sutured. No difficulty in closing the gap. He was discharged on the 14th day. He now has no disability but has experienced a little trouble with varicose veins which were present before operation and have been treated by injection. He had difficulty walking upstairs at first.

Case 2.—A man aged 60, a window cleaner, fell 22 feet from a ladder, cut his chin, fractured his right tibia and fibula at the ankle-joint and his left patella (compound) on May 14, 1938. Operation later in the day (chin and ankle had already been dealt with). Local infiltration anæsthesia with Pantocaine 1 in 1000 about the patella. Found to have small lacerated wound over the patella and four or five widely separated fragments of the kneecap. Skin wound was excised and extended into a transverse incision. Patella was excised and quadriceps tendon sutured with interrupted sutures. Uneventful recovery; almost full function in three weeks. This leg is now much better than the other which sustained the Pott's fracture.

Case 3.—A woman aged 60 fractured her patella without deformity on Oct. 22, 1938. Operation on the 29th under spinal anæsthesia. Transverse incision. Quadriceps tendon was intact; it was reflected laterally from the fragments and sutured. Patella excised. She was up on the 12th day but had a fainting attack. Went home on the 21st day and now has no disability. Going up and down stairs presented some difficulty for 2 months, but she was unusually apprehensive.

Case 4.—A woman aged 30 fractured her patella in a motor accident on Nov. 20, 1938. The fragments were not separated. Operation on Dec. 13. Fragments excised and tendon sutured. She walked home on the 14th day and regained stability and mobility almost at once.

Case 5.—A man aged 35 slipped on the ice and fractured his left patella with wide separation on Dec. 30, 1938. Operation on the 31st under local infiltration with pantocaine. Fragments excised and tendon sutured. He returned home on the 14th day and to work on the 30th day.

Case 1: eight months after fracture of right patella.

To summarise these cases, three men and two women aged 72, 60, 60, 30 and 35 have been treated. The fragments were widely separated in three and were in apposition in two. Interrupted No. 40 thread sutures were used in each and healing was by first intention although one was a compound fracture. Massage and exercises were used in only one case and then as a placebo.

THE OPERATION

The operation is carried out as soon after the accident as the patient's condition permits. If possible it is done on the day of the accident. This early repair after the injury has been practised since 1930 and no ill effects have followed it. The anæsthetics used have been a general once and spinal and local infiltration twice each; the amount of injection necessary to make the latter effective is surprising; a unilateral spinal is probably the ideal.

Technique.—A tourniquet has been applied occasionally; it is not essential. The incision is a generous transverse one extending well beyond the lateral borders of the patella in order to expose the quadriceps expansion. It is placed midway between the fragments when they are separated or across the centre of the patella if there is no displacement. The hæmatoma in the wound and in the knee-joint is always large and is turned out. The fragments are "filleted" from the shredded quadriceps tendon—a slow and finicky proceeding. The patella is best held with a piece of sterile gauze. The edge of the scalpel is kept cutting on to the bone in order to preserve the tendon as much as possible. The quadriceps expansion is closed by a series of two-hitch interrupted sutures: these do not tend to cut out of the tendon. The thread is tied only when all the stitches are inserted. A little difficulty has been encountered twice in closing the gap in the centre, for the tissue has been so fragmented and shredded. Numerous interrupted fine thread sutures (No. 90) were required to "darn" the deficiency soundly with the shreds available. The deep fascia is closed, and then the skin is sewn up with interrupted stitches.

Dressing.—A Robert Jones bandage, with at least six alternate layers of wool and bandage is firmly applied, and the limb is loosely tied to a soft head-pillow.

Aftercare.—The recovery has been uneventful in all the cases. The pillow is removed on the 5th day, and the patient is encouraged to move the leg in bed and to bend it as much as the dressing allows. On the 7th day the exercise is increased to sitting up with the legs over the side of the bed, bending and actively swinging them. One layer of bandage and wool is removed per day from now on, so increasing the range of flexion, and the use of the limb and foot is diligently pursued. On the 10th day patients get up, put on outdoor shoes (not slippers, an important point to avoid a flat-foot), and walk with the aid of an assistant and a stick. On the 12th day the stitches are removed and on the 14th day the patients go home. The joint is protected and kept warm by a woollen kneecap, worn day and night. Steadily increasing walks are taken daily and in addition the following exercises are practised, two or three times a day:—

(1) Marking time, lifting the knees high on to the abdomen.
(2) Swinging the leg back and attempting to kick the buttock with the heel while standing; first one and then the other.
(3) Alternate standing on the toes and on the heels.
(4) Bending the knees until the patient is sitting on the heels.
(5) Kicking the feet forward as high as possible.

No massage is required. These exercises are designed to develop both stability in the limb and mobility in the joint. The photographs shown in the figure illustrate how this has been attained; the positions were unrehearsed. The reader is invited to hold this posture while a camera is focused and a snap taken; it will probably be conceded that it constitutes a fair test.

The advisability of removing the patella in the absence of separation will doubtless be questioned. Its justification is the relief of pain and early return not only to getting about with active unsplinted use of the knee but also to work. Against it is the risk of opening the knee-joint, but this factor is to a large extent known and preparations can be made to minimise it.

Incidentally it may be added that good results are reported from excision of the patella in osteo-arthritic knees.

SUMMARY

The treatment of fractured patella by excision of the fragments has proved highly satisfactory. The technique is straightforward, patients soon return to work, and full function of the knee is restored.

In five cases, three being over 60, recovery was uneventful.

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COMPLETE FREEDOM FROM DENTAL CARIES

A COMPARATIVE STUDY OF TWENTY-FIVE CHILDREN

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DENTAL caries is so widespread among human beings that it has come to be considered almost a normal perquisite of civilisation. Even in school-children investigations have repeatedly shown an incidence of over 90 per cent., and a really sound set of teeth in an adult is practically unknown. The very universality of the disease makes its ætiology all the more obscure, and the factors which have been implicated at one time or another are many. Briefly, at the moment, medical and physiological investigators are inclined to favour some general cause, in part at any rate a nutritional deficiency, whereas the dentists are more interested in the mechanics of the immediate cause and accordingly lay more emphasis on local factors—dental irregularity, carbohydrate fermentation, changed salivary pH, and defective oral hygiene.

In an endeavour to trace some of the grosser causal factors we made an intensive study of a group of children between the ages of ten and fourteen, with caries-free mouths and no history of caries in the permanent dentition, and compared them with a group showing gross caries but similar in other respects.

We discovered that an investigation on somewhat similar lines had recently been carried out in Leeds by Read and Knowles (1938), who had studied the diet and habits of two groups of 12 similarly selected children. They did not specifically mention inquiry into the family dental history or the personal history of illness, and they did not examine the teeth and inquire into the circumstances of the brothers and sisters of the children in their two groups. On the other hand, they worked out the present dietary of the children in considerable detail. Careful upbringing, an adequate diet with good protein content and daily fresh fruit and milk, regularity of meals, limited intake of fermentable carbohydrate, and adequate oral hygiene were among the factors they found to favour freedom from dental caries. They found economic circumstances in the two groups so variable as to be inconclusive, and they observed the relatively low incidence of caries among the inmates of an orphan institution.

PRESENT INVESTIGATION

We classified the severity of dental caries as follows:

	Average number of cavities
A, complete absence of caries	0
B*, very nearly perfect	1
B, slight to moderate caries	2
C, moderate caries	4
D, moderate to bad caries	7
D*, very bad caries	12
E, extreme caries: involvement of practically every tooth	20

As a first step, 1842 children, aged ten to fourteen, in Newcastle elementary schools were examined by one of us (D. M. R. C.) and the results tabulated thus:—

A	B*	B	C	D	D*	E	Total
25	88	407	810	451	55	6	1842
(1·3%)	(4·8%)	(22%)	(44%)	(24·4%)	(3%)	(0·3%)	(99·8%)

The 25 children in group A and 25 taken from group D* formed the material for a more detailed study. (The latter 25 were selected from the total 55 by taking those attending schools nearest to the place of examination.) These 50 children, with their mothers and as many of their brothers and sisters as could be mustered, attended the Raby Street dental clinic of the Newcastle education committee. Their mouths were again carefully examined and charted, and a detailed personal and family history of all the children (dental, dietetic, and general) was taken. Over 100 children were thus examined, and the mother's health during pregnancy, circumstances of birth, family history, income and housing conditions, infant-feeding, present diet, habits, and past pathological history were investigated in as great detail as possible, the information sometimes being augmented by a visit to the home.

RESULTS

A comparison of the social state of the two groups of 25 children gave the following figures:—

	A	D*
Total average weekly income per head of family	10*s.* 2*d.*	10*s.* 6*d.*
Average number of live children in family	4·01	4·20
Rooms	3·6	3·1

The chronological distribution of the 25 A and the 25 D* children within their 50 families showed some interesting differences:—

	A	D*
Eldest child in family	15	8
Second child	4	4
Third child	6	5
Fourth or later child	0	8

In other words, A children were often the elder children of the family, whereas the D* children were more often younger children of a family with considerably older brothers and sisters. It is difficult not to associate this apparently higher incidence of caries in the younger children of the family with the working-class mother's frequent complaint that *her* teeth were "fairly good until she started having children." Such an association might possibly be related both to maternal calcium exhaustion from the demand of repeated pregnancies and to the unfavourable economic position of the later children in families with relatively fixed incomes.

Examination of the teeth of the younger brothers and sisters of the children in the two groups revealed the distinctly familial incidence of dental caries (see table I). (It was possible to examine only these younger sibs mainly attending the same school.) Table I shows that 58 per cent. of the brothers and sisters of the A children were A, B*, or B, as against 4 per cent. of the D* brothers and sisters; and 96 per cent. of the brothers and sisters of the D* children fell into the C, D, or D* class as against 42 per cent. of the A brothers and sisters.

Inquiry into the family dental history elicited the following facts: a strikingly good history on both sides—e.g., mother's teeth excellent, grandfather a "sound" head of teeth at 70—was found in 9 A children and 1 D child; and a strikingly bad history on both sides—e.g., mother had false teeth at 17, father at 23—was found in 8 D children but no A children. The D child with a good history had feeding difficulties and rickets; but in this connexion it is interesting to compare the results of re-examination (by D. M. R. C.) of the 177 children in the Ponteland (Newcastle-upon-Tyne education committee) children's home, not otherwise included in this series but previously the subject of study from other angles by one of us (Miller 1938) which yielded the percentages shown in table II. These figures for the Ponteland children's home compare very favourably with those recorded for any community living under civilised conditions and, together with the fact thas most of the caries present was slight or tended towardt arrested decay, indicate that any hereditary tendency which may exist is susceptible to improvement in environment even after the age of three years,the age at which children are admitted to the children's home.

TABLE I—FAMILIAL INCIDENCE OF DENTAL CARIES

State of teeth	A children's 26 brothers and sisters seen	D* children's 25 brothers and sisters seen	1842 school-children
A	1 (4%)	0	1·3%
B*	4 (15%)	0	4·8%
B	10 (39%)	1 (4%)	22·0%
C	5 (19%)	9 (36%)	44·0%
D	5 (19%)	7 (28%)	24·4%
D*	1 (4%)	8 (32%)	3·0%
E	0	0	0·3%

TABLE II—COMPARISON OF INCIDENCE OF DENTAL CARIES

State of teeth	Ponteland children's home		Newcastle schools
	177 children aged 3–18½	115 children aged 9–15	1842 children
A	25·9	27·8	1·3
B*	10·7	12·2	4·8
B	32·2	32·2	22·0
C	21·4	20·0	44·0
D	9·6	7·8	24·4
D*	0	0	3·0
E	0	0	0·3

The inquiry into infant feeding indicates that breast-feeding and perhaps, to some extent, supplementary vitamins appear to be factors in determining later freedom from dental caries:—

	A	D
Breast-fed, wholly or preponderantly until nine months or later	22	15
Artificially fed	3	10
Additional cod-liver oil	11	4
Additional orange juice	14	9

The difference shown by Read and Knowles (1938) to exist between the present diets of their two groups was

so distinct that we hoped to demonstrate such a difference by relatively crude methods of inquiry; but, beyond showing a 50 per cent. higher habitual consumption of "fresh" milk (practically all the milk used by both these groups was pasteurised) in the caries-free group, our results by such methods were inconclusive. Indeed it appears practically impossible to obtain by any method short of direct observation even a moderately accurate qualitative and quantitative dietary history in a human being beyond the age of infancy.

In view of the often repeated assertion of a relationship between irregular dentition and caries, the mouths were charted and the following results obtained:—

	A	D
Regular dentition	9	9
Very irregular dentition	4	6
Others (not perfectly regular)	12	10

Similarly unconvincing were the findings with regard to oral hygiene: 16 of the 25 children with perfect teeth had never used a toothbrush regularly, and 12 not at all.

Perhaps the most interesting findings are yielded by inquiry into the histories of past history of common illnesses:—

	A	D*		A	D*
Measles	22	25	"Pneumonia"	2	7
Measles complicated by bronchopneumonia	0	3	Diphtheria	1	0
Pertussis	8	13	Scarlet fever	2	1
			Chronic cough	3	8
			Rickets	0	7

The average age-incidence of measles was 4·5 years and of pertussis 5·5 years in group A, and 3·2 and 3·4 years respectively in group D*, and cases of measles in children under 4 years numbered 8 in group A and 14 in group D*. The incidence of other past illnesses in the two groups is also very illuminating:—

	A	D*		D*
Acute appendicitis	1		"Anæmia"	4
"Tonsils and adenoids"	1	4	Chronic abscesses	1
Diabetic (12 months' history, on 150 g. of carbohydrate and insulin)	1		Meningitis	1
			Bronchiectasis †	1
Mastoid		2	Empyema	1
Tuberculous glands		1	Cœliac disease †	1

† Confirmed by hospital investigations.

These figures reveal a spectacular amount of past illnesses among the 25 D* "normal" children picked out from their 1842 fellows for examination solely on account of their dental condition. Although in some cases the onset of noticeable caries seemed to be directly traceable to some severe illness, no causal relationship can be defined on the basis of this data. Nevertheless, reviewing the whole series of cases and the ages at which the illnesses occurred, it is difficult not to conclude that this high incidence of illness was probably a causal factor in the development of caries. Even the maternal health during pregnancy is shown to be different in the two groups:—

	A	D*
Toxæmia of pregnancy	1	5
"Unwell" during pregnancy, ranging from "anæmia" and "malnutrition" to "tuberculosis"	0	6

SUMMARY

Examination of two groups of 25 children between the ages of ten and fourteen, one group with complete freedom from dental caries and the other group suffering from gross caries, demonstrates certain factors which were apparently associated with freedom from dental caries: (1) good family dental history (not apparently of such significance as good general hygiene and diet); (2) careful infant feeding, especially breast-feeding; and, probably above all, (3) absence of severe illness and an early incidence of infectious fever. No difference of present economic status was demonstrable between the two groups, but a point of importance appeared to be that children with bad teeth were often the younger members of a family, whereas those with good teeth were frequently first children. In this series of cases irregular dentition and inadequate oral hygiene did not appear to exercise any unfavourable effect on the degree of freedom from caries.

We wish to thank Dr. G. C. M. M'Gonigle and Dr. J. C. Spence for helpful criticism and advice, and the Newcastle-upon-Tyne education committee for the facilities afforded to us.

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MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF SURGERY

AT a meeting of this section held on July 6, Mr. CLAUDE FRANKAU being in the chair, Dr. GORDON MURRAY, of Toronto, read a paper on

Heparin in the Prevention of Thrombosis

The properties of heparin as an anticoagulant had, he said, been discovered in 1916; he had become interested in it because of the help it afforded in experimental work on blood-vessel anastomosis. One of the most important steps had been the obtaining of heparin in a pure state whereby its toxicity had been eliminated. The crystalline barium salt which had been produced had a constant potency. Opinions differed as to whether heparin was an antithrombin or an antiprothrombin. It might be injected subcutaneously, applied to surfaces, or injected into vessels. In vessels its action might be restricted to a length of vessel, or, by injection into the general circulation, it might act by altering the clotting-time of the blood. This general effect had been found the most useful. Veins and arteries could be divided and sutured under the influence of heparin; Dr. Murray gave illustrations of perfect healing with complete patency and no evidence of clotting. Without the use of heparin, such results were rare; with heparin they occurred in over 90 per cent. of cases. In grafting experiments—e.g., of a length of jugular vein into a gap in the carotid artery—without heparin thrombosis occurred every time within three hours; with previous administration of heparin for 7–9 days by constant intravenous drip—admittedly a difficult procedure to carry out successfully in animals—complete patency of the grafted vessel was assured. Dr. Murray had followed the histological changes in these grafts up to one year after the operation and was able to demonstrate how the grafted vein gradually assumed the characters of the artery. A thrombus produced experimentally by insertion of a foreign body at the bifurcation of a peripheral artery, such as the femoral, could be successfully removed in the heparinised animal

even after it had remained in situ for twenty-four hours and had become attached to the intima. Experiments on the splenic vein suggested that heparin had a similar anticoagulant effect in the portal system; in the transplantation of organs also heparinisation ensured success. One valve of a heart had been removed and a new valve substituted and the animal continued to live without thrombus formation in the heart.

Clinically, heparin had been given by continuous intravenous drip to more than 400 patients without toxic effects; superficial veins near the wrist were used, and no vein had thrombosed up to two weeks. Without heparin it was usual for the veins to thrombose at the end of 26–48 hours. As a preventive of postoperative thrombosis and pulmonary embolism he thought heparin was of value. It had been found that the incidence of pulmonary embolism in 600 major operations was 2 per cent.; in 400 cases in which patients received intravenous heparin after operation no case of pulmonary embolism occurred. Embolectomy was a field of surgery where the use of heparin had been most helpful; 60 per cent. of these operations were successful in heparinised patients. The heparin was administered twenty-four hours after the operation, so as to guard against undue bleeding at operation. The clotting-time returned to normal in one and a half hours, and there was no negative phase later on.

In 72 cases of thrombophlebitis in which heparin had been administered the results had been impressive. Pain, temperature and œdema had rapidly subsided. The clot was not absorbed. In pulmonary embolism Dr. Murray claimed no operative success, but in some cases of repeated embolism he believed that heparin had proved of value in preventing further attacks. In mesenteric thrombosis, necessitating large bowel resection, success was rare; he had seen only one case recover. But four consecutive cases were alive and well in which the resection had been done and heparin administered. Two subsequent cases died, one after nine days, from peritonitis. In splenectomy and in blood-transfusion heparin had proved its value, and there might be a field for its use in coronary thrombosis. The rationale of its use in coronary disease was not clear, but if it were true that occlusion at the commencement was incomplete then heparin might prevent complete occlusion. In cases in which heparin had been used, all they could say was that the clinical course and the electrocardiograms had been unusual. He described a case in which he had excised a popliteal aneurysm and grafted a length of the jugular vein to re-establish the continuity of the artery. The patient subsequently developed an aneurysm in the lower end of the venous graft. This was sutured and the man returned to the Bush with a perfectly normal leg.

Summing up, Dr. Gordon Murray said it was proved that heparin was non-toxic, both in animals and human beings; that it prevented thrombosis; that it was valuable in determining success in operations on blood-vessels, and in cases in which thrombosis was a feature.

DISCUSSION

The CHAIRMAN confirmed the value of heparin in the operation of embolectomy. He congratulated Dr. Murray on the brilliance of his work, which he said was well recognised in Toronto.

Mr. G. GORDON-TAYLOR said he did not feel so despondent as Dr. Murray about mesenteric thrombosis: almost half his cases had recovered.

Sir JAMES WALTON said he knew of no piece of experimental work in surgery which had been so rapidly and successfully carried through or so rapidly applied to clinical use as had Dr. Murray's.

In reply to various speakers, Dr. MURRAY said that there was still great difficulty in assessing accurately the heparin content of blood; possibly however in cases with thrombosis the heparin content might not be a significant factor. In Toronto they had found it best to determine the individual clotting-time for a patient and aim at doubling or trebling that, rather than at producing a standard clotting-time. The simplest possible method of estimating clotting-time had proved the most satisfactory; they had given up complicated machines. The average case required 750–1000 units of heparin per hour intravenously. The price of heparin was as real a difficulty in Toronto as here; he was afraid it would not be appreciably lower till a synthetic preparation came on the market. There had been successes in septicæmic cases—as, for example, in septicæmia following carbuncles; and physicians were hoping that heparin given in vegetative endocarditis might prevent the thrombus forming on the valve and thus destroy the nidus for the growth of organisms.

OXFORD OPHTHALMOLOGICAL CONGRESS

As is now customary, this congress gathered at Keble College, Oxford, where on July 5 the members met informally and dined in hall. The discussions and demonstrations took place at the School of Anatomy, beginning next day with the installation of Mr. PERCIVAL HAY (Sheffield) as master, in succession to Dr. C. G. RUSS WOOD, who died shortly after last year's meeting.

Chiasmal Lesions

The Doyne lecture was delivered this year by Mr. F. A. WILLIAMSON-NOBLE (London), who took as his subject the Ocular Consequences of Certain Chiasmal Lesions. The characteristics of the chiasmal syndrome, he said, include defective central vision, optic atrophy (with or without papillœdema), and very numerous and varied defects of the visual field. The common causes are:—

(a) *Meningiomas* which grow from the dura covering the circle of sinuses surrounding the pituitary diaphragm. As they enlarge, these raise the chiasma and stretch both it and the optic nerves. Irregularity of pressure accounts for corresponding asymmetry of the field defects.

(b) *Suprasellar pituitary adenomata* occur either as outgrowths from the stalk of the gland, or from its upper part. In either case there may be a strange absence of signs at first, the most likely evidence being field changes Small test objects and the use of the two-metre screen are valuable in this connexion.

(c) *Craniobuccal pouch cysts*, enlarging from remnants of the hypoglossal duct, form a third group. They are commonest in childhood, and tend to calcify.

(d) *Arachnoiditis* of the chiasmal region may arise from many causes. The clinical features appear as the result of adhesions or cyst formations. General neurological findings may be absent.

(e) *Aneurysms of the circle of Willis* arise and yield signs after the age of 30 as a rule. Suddenness of onset and pain are the chief features. Radiography may reveal calcification in the aneurysmal wall.

(f) *Chiasmal glioma* is rare. The age-period is youth and there is a tendency towards enlargement of the optic foramina.

Where adhesions develop—e.g., in syphilitic complications—their division may lead to great improvement of vision by stopping the otherwise inevitable advance of pressure atrophy.

Mr. Williamson-Noble paid tribute to those who, through the media of anatomy, pathology, radiology and perimetry, have helped to provide a reasonable chance of preoperative differentiation, although even now many cases remained unclassified until operation adds certainty to the diagnosis.

Vital Staining

Mr. ARNOLD SORSBY (London), in a demonstration of vital staining, explained that although it has been held that a blood-brain barrier resists the vital staining of the brain and its associated element the retina, this is not really correct. The reason why the retina does not take stain well is that it has a very high oxygenating capacity. If this is impaired by retinal disease, staining will take place according to the degree of the damage. In a case diagnosed as retrobulbar neuritis because damage to one optic nerve was seen with the ophthalmoscope vital staining demonstrated damage to the other optic nerve and the condition was traced to a pituitary tumour.

Orthoptics

The value of orthoptic training in cases of heterophoria came under heavy cross-fire: some sang its praises but some thought it an extravagant means of doing what (they maintained) could equally well be done by careful refraction, occlusion of one eye, and attention to physical health.

The case for orthoptics was opened by Mr. KEITH LYLE (London), while a critique of the method was delivered by Mr. F. W. LAW (London). Much of the argument ranged round the question whether there is any great advantage in educating vision up to the full appreciation of stereoscopic consciousness. It is well recognised, as Mr. Law pointed out, that many members of the community pass their lives with the comfort of binocular vision but without its higher refinements. He granted nevertheless that the arrival of orthoptics has allowed the ophthalmic surgeon to ascertain the exact binocular state of a patient, and that this is a very useful guide for attack upon the squint by surgery. It has helped also in the assessment of prognosis. The discussion brought out the fact that in heterophoria orthoptic exercises are capable of giving immense relief from headache, strains, and potential neuroses.

Other speakers were Miss SHEILA MAYOU (London), Wing-Commander P. C. LIVINGSTON (London), Dr. E. B. ALABASTER (Birmingham), Mr. GEORGE BLACK (Leeds), Dr. H. CAMPBELL ORR (Wolverhampton), Mr. P. J. EVANS (Birmingham), Mr. O. M. DUTHIE (Manchester) and Mr. BERNARD CHAVASSE (Liverpool). Miss MARGARET DOBSON (London) showed a film illustrating orthoptic training in cases of convergent concomitant strabismus.

The Aqueous Humour

Dr. J. DOUGLAS ROBERTSON (London) read a paper entitled The Aqueous, a Secretion. As a biochemist he has satisfied himself that work is done and energy expended in the formation of the fluid; that a specific substance can be isolated from it; that a chemical equilibrium between blood and aqueous resembles that between blood and a secretion; and that the interchange over the blood-aqueous barrier resembles that over the membrane between the blood and the gastric juice, and not that over the capillary intervening between the blood and interstitial fluid.

Miners' Nystagmus

Mr. T. HARRISON BUTLER (Birmingham), in describing miners' nystagmus, laid greatest emphasis upon the toxic and psychasthenic influences at work, and maintained that the miner in general is a highly strung person—partly because of the prevalence of inbreeding in mining communities. The toxic influences, he said, emanate from methane, while the neuroses are favoured by the fear of unemployment and by subconscious apprehension of accident. It was most exceptional to find a case of miners' nystagmus that could be attributed to deliberate mimicry. He doubted whether there is ever a complete recovery in those cases that have endured for some time.

Dr. DOUGAL CALLANDER (Doncaster) said that when work is good and wages are high the case-rate falls sharply away. He thought recurrences are rare if the men are given immediate and suitable work above ground.

Mr. HERBERT CAIGER (Sheffield) spoke of the presence of an inhibitory factor within the cerebral arc, which prevents the onset of acute symptoms even when oscillations are to be seen. It is when this natural compensatory mechanism breaks down that the trouble starts. On the legal issues, both coal-owners and colliers have had grounds for complaint. He agreed with Mr. Harrison Butler that the perpetual use of the term "miners' nystagmus" is bad; so also is "miners' neurosis."

Sir ARNOLD WILSON, M.P., concurred, and said he felt that the cure did not lie with the oculist, but rather within the scope of the physician with expert knowledge of psychology. Posture at the coal-face has possibly, he thought, been too much neglected.

Mr. W. J. W. FERGUSON (Sheffield) described experimental studies showing that very bad lighting could be a contributory cause.

Protection of the Eyes

Sir ARNOLD WILSON, in a paper on workmen's compensation and disability schedules, spoke of the need to employ protective goggles wherever the eyes are exposed to injury, be it intense light, heat, or flying metal. The exhibition of protective shields and tinted glasses on all suitable occasions is important, since it helps the employer of labour to select proper protective materials.

Sir ARNOLD LAWSON (London) gave a paper on the application of tinted glasses to industrial and other purposes, and accompanied it by a demonstration of the effects of different coloured filters combined with suitable metal bases (iron or cerium) upon the various components of the spectrum. He discussed the influences of these in industry, aviation, and sun-glare, and mentioned Crookes, Neophan, and Polaroid. He remarked particularly that Protex glass has a strong influence upon the infra-red end of the spectrum. The problem of glass-blowers' cataract is, he said, still with us, although glass-blowing by hand is now dying out.

Miscellaneous Communications

Dr. BERNARD SAMUELS (New York) spoke on drusen of the retina. H. Müller (1858) was first to describe these bodies; they are found both in the choroid and optic nerve but only very rarely in the retina. He described the histology of the rare type coming from the glial cells of the retina. Poor nourishment and irritation are factors in their production.

Mr. J. W. TUDOR THOMAS (Cardiff) showed a series of photographs of the results of corneal grafting. In one case the donor eye had been enucleated over a

hundred miles from the patient operated upon, and the result was entirely successful. Success can be got by using the corneas of cadavers, but actually in one or two attempts of this kind he had not been successful. The cases selected, however, were not promising.

Dr. LA ROCCA (New York) showed a film of a new method of stitching when operating with corneal grafts.

Mr. F. E. PRESTON (London) demonstrated a new unobtrusive occluder for raising the vision of amblyopic eyes, and for other cases in which it becomes necessary to occlude. It presents a better appearance than do black shades and entirely opaque glass screens. Its value in amblyopia was doubted by some members on the ground that it does not sufficiently eliminate vision.

Mr. P. G. DOYNE (London) gave a short communication entitled Number Forms. It seems that about one person in thirty sees numbers as patterns of weird shape, curved or angular, with some of the groups accentuated. They are set in space as a picture by visual memory. They are thought to be caused by such things as the remembered arrangement of clock faces during infancy, and tend to persist in the proportion stated. This method of figure visualisation is thought to account for the phenomenon of lightning calculation. Those who do not see figures in this way find the process quite beyond their understanding.

Mr. THOMSON HENDERSON (Nottingham) put forward the question, How is a hyphæma or a hypopyon resorbed? He maintained that extensive section-cutting of the eyes of mammals reveals no anatomical barrier at the angle to prevent the free passage of aqueous into the suprachoroidal space. He is convinced that this is the normal physiological drainage route of the aqueous.

The annual dinner was held on July 6, when there was an attendance of about 130, including Prof. R. R. Macintosh (Oxford) as guest of honour. Mr. P. H. Adams (Oxford) acted as deputy master of the congress and Mr. F. A. Anderson (Shrewsbury) as hon. secretary.

SOCIETY FOR THE STUDY OF INEBRIETY

AT a meeting of this society on July 11 a discussion on

Alcohol and Drug-addiction in Relation to Crime

was opened by Dr. NORWOOD EAST, who said that Great Britain had the lowest crime-rate of any great European community and a much lower one than the United States of America, especially as regards violence. In 1937, of 805,336 persons convicted 52,425 (just under 6½ per cent.) were guilty of drunkenness, as against an annual average of 193,354 in 1910–14. The number had declined continuously from 1920 to 1932 but had increased each subsequent year. In 1937 the number of known drug-addicts was 620, but only 31 persons were dealt with for offences under the Dangerous Drugs Acts, 1920–32, and Regulations thereunder. Apart from drug-addiction, crime might be associated with drug-addiction if a criminal became a drug-addict or if an addict committed a crime, but this was unusual. In fact, in this country the relation of drug-addiction to crime was insignificant in comparison with alcoholism.

As regards the incidence of alcoholism in the parents of criminals, in 4000 youths at Wormwood Scrubs prison in 1930–37 a family history of alcoholism was found in 52 per thousand, being more frequent in association with offences against the person, discipline, and property and with multiple convictions; the incidence of a family history of drug-addiction was insignificant (2¼ per thousand). Dr. East had investigated the incidence of alcoholism among 100 men and youths tried for murder in post-war years (90 of them in the last ten years) and had found alcohol as a predominant or a contributory cause in 19. He had also examined between April, 1907, and December, 1910, 1000 cases of men and youths charged with attempted suicide and had found alcohol as an important cause in 39·3 per cent. He did not know of any statistics showing the relation of alcohol to sexual crimes in this country; but in 1924 he had found only 9 alcoholics among 150 men charged with exhibitionism. Criminals sometimes took to alcohol to nullify their inhibitions, and the association of alcoholism with prostitution was sometimes due to the same purpose. Every practical criminologist would attach some importance to the association of alcoholism with crime, but it was very easy to over-emphasise the connexion.

Insanity might lead to drunkenness, and vice versa. The typical crime committed in mania a potu was one of violence, and the terrifying hallucinations of delirium tremens might be responsible for murder, suicide, violent assaults, or damage to property. In the more chronic forms of insanity, theft, fraud, and sexual offences were not uncommon; crimes of violence might be due to hallucinations or to delusions; and crimes of violence, sexual offences, thefts, embezzlement, or vagrancy might be caused by mental deterioration brought on by chronic alcoholism. Criminal conduct was obviously favoured by the abnormal mental condition due to drunkenness apart from insanity. The impairment of reason, the lack of appreciation of the consequences, the emotional disturbance, the divorce from reality, the loss of inhibition, and the consequent unleashing of personal predilections were responsible for many crimes committed by alcoholics.

There was a tendency in some alcoholics for subsequent crimes to be of the same pattern as a previous crime, thus resembling some cases of crime due to epilepsy. This resemblance might be accentuated if there were no subsequent recollection of the criminal conduct; and, if an epileptic had taken alcohol before committing a crime, the diagnosis between alcoholic and epileptic automatism might be impossible. It was also important to remember that after certain illnesses, such as head injury, brain disease, or a previous attack of mental disease (especially delirium tremens), the offender might be more susceptible to alcohol than formerly—the so-called pathological drunkenness.

In considering the legal aspect Dr. East said that formerly drunkenness was not accepted as an excuse for crime, because the defendant did wrong in getting drunk, and an offender under the influence of drink could derive no privilege from a madness voluntarily contracted. Later it was ruled that, on an indictment for murder, intoxication of the accused might be taken into consideration to show that the act was not premeditated. In 1920 the House of Lords decided that insanity, whether produced by drunkenness or otherwise, was a defence to the crime charged.

The treatment of the alcoholic and the drug-addict guilty of a major crime was not difficult, for the sentence imposed was usually long enough for the efficient withdrawal of the drink or drug as well as for general and special medical treatment. It was more difficult in petty crime associated with alcoholism

or drug-addiction because of the shortness of the sentence. Compulsory detention of inebriates in the past had been found ineffective in the more advanced cases. Medical treatment might be more successful if tribunals had authority to enforce compulsory detention on criminal alcoholics and drug-addicts for considerable periods early in their careers. Clause 34 of the Criminal Justice Bill now before Parliament proposed to enable courts of assize and quarter sessions to pass two new types of sentence: corrective training for not less than two and not more than four years on offenders between 21 and 30 whose records, character, and habits made such a sentence expedient for the training of the offender; and preventive detention for a similar period on persons over 30 whose criminal antecedents and mode of life made such a sentence expedient for the protection of the public. Under these provisions some of the more criminal alcoholics would be detained with benefit to themselves and the public. Clause 38 enables a medical report on the mental condition to be obtained without remanding the accused; thus inebriety and drug-addiction as the underlying cause of the crime might be diagnosed earlier. Clause 19 enables offenders with some form of mental illness or abnormality, though not certifiable, to undergo medical treatment as either resident or non-resident patients.

Too much reliance should not be placed on psychotherapy. Evidence was given before the Persistent Offenders Committee in 1931 that psychotherapy had proved successful in only 2 or 3 cases of inebriety out of 60, and in only 1 case out of 11 morphia addicts. In an investigation of the psychotherapy of crime at Wormwood Scrubs in 1934–38 no case of alcoholism had been treated by this method, and 4 carefully selected cases of drug addiction gave disappointing results. In the report based on this investigation Dr. East and Dr. W. B. de B. Hubert had recommended the establishment of a special penal institution where psychiatric treatment could be given more effectively than in an ordinary prison to mentally abnormal but not defective or insane prisoners. Further investigation, however, was necessary before treatment of confirmed alcoholics or drug-addicts could be undertaken with confidence.

Some women were repeatedly sentenced to short terms of imprisonment for drunkenness and made up the "stage army" of inebriates in the women's prisons. Dr. J. C. McI. Matheson, governor of Holloway prison, had said that of 2222 women received into that prison in 1936 for various offences 1112 had been convicted of drunkenness, the youngest being 22, 5 per cent. under 30, 55 per cent. 31–50, and 40 per cent. over 50. Dr. East had been much impressed, when an inspector under the Inebriates Act, 1898, by the fact that a considerable proportion of women in the institutions remained in residence indefinitely, although they had not been received under the act and were at liberty to leave. They found in the institutions the shelter, companionship, sympathy, interest, and freedom from anxiety denied to them in the outer world. According to Sir Samuel Hoare the number of habitually inebriate women was steadily and quickly decreasing.

In conclusion Dr. East said that, though the alcoholic, the drug-addict, and the criminal were abnormal, the clue to much that arose from their association would be found in the study of normal behaviour. Medicine could contribute much to the solution of the problems raised by them, but future social progress and administrative action must be relied on for large-scale results.

ASSOCIATION OF CLINICAL PATHOLOGISTS

Clinical Pathology of Tuberculosis

AT a meeting of this association held in the Coventry Joint Laboratory on July 1, with Dr. A. F. WRIGHT in the chair, a paper on

TESTING MILK FOR TUBERCLE BACILLI

was read by Dr. S. ROODHOUSE GLOYNE (London). He said that there are three possible methods of carrying out the test—namely, direct film examinations of the centrifuged deposit, cultivation on non-glycerinated egg medium, and guineapig inoculation. In his experience direct film examination only yields about a tenth of the number of positives that animal inoculation does. Cultural methods, though valuable for other fluids and for sputum, are of little use in milk-testing, owing to the prevalence of saprophytic aerobic spore-bearing organisms. The guineapig test not only gives the highest percentage of positives but it is also the only test which can be used as absolute proof in a court of law. The drawback of the test is, of course, the length of time taken to obtain the answer. He recommends that 100 c.cm. of milk should be centrifuged for half an hour at 3000 revolutions per min., and that the centrifuged deposit should be treated for the same length of time with normal soda to destroy secondary organisms and then neutralised with normal hydrochloric acid before inoculation. The animal should be killed not less than five weeks afterwards and no case must be reported as positive without definite naked-eye signs of tuberculosis (including infection of the regional lymph-glands) and the finding of acid-fast bacilli microscopically. Dr. Gloyne's earlier figures—1560 tests for the years 1928–31—showed 9·1 per cent. of positives, whilst his latest figures—3960 for the years 1935–39—show only 6·2 per cent. Although the two series are for various reasons not strictly comparable it looks as though some improvement in our milk-supply is at last taking place. A series of 276 pasteurised samples, however, yielded 2·5 per cent. of positives, which seems to indicate that not all pasteurisation plants are efficient.

COMPARISON OF CULTURE AND ANIMAL TESTS

Dr. E. N. DAVEY (Gloucester) pointed out that it is in respect of the bacillus most associated with his name that the postulates of Koch are most commonly broken, in that as a rule no attempt is made to isolate tubercle bacilli from suspected cases by culture. This is because of the difficulty experienced in culturing the organism, but this difficulty has to a great extent been overcome by the introduction of the media of Lowenstein, Petragnani and others. Dr. Davey's present series of results are based on cultures on Lowenstein medium, but he believes that Petragnani's medium gives greater speed and richness of growth. After describing his preparation of the medium and his method of preparing the inoculum by digesting it with 4 per cent. sodium hydroxide followed by repeated washings with saline or sterile distilled water, he detailed his results in a series of 112 specimens of sputa, pleural exudates, urines, pus and cerebrospinal fluid. He had 18 per cent. positive on films, 32 per cent. on cultures and 29 per cent. in animals, when the identical material was used in each instance. In another series of 150 cases he had 18·5 per cent. positive in films and 33 per cent. positive on cultures. These specimens were selected

ones from cases where the clinical findings and the direct film findings disagreed. In cultures the vast majority showed an excellent growth in three weeks, as compared with five to eight weeks by the animal method. In another small series of sputa specially selected as negative on film examination, he found 3 out of 12 were positive on cultural examination. Dr. Davey concludes that although the animal will still be the ultimate test of pathogenicity, the cultural method recommends itself as being equally accurate (no positive film failed to produce a growth), quicker and cheaper; it does away with the expense and anxieties of an animal house and the need for procuring a licence for vivisection. It is an adequate substitute for the animal test in disclosing tubercle infections in "T.B. minus" cases, and would also be a good guide in determining when it is safe to release a patient from isolation in a sanatorium.

DIFFERENTIATING SAPROPHYTIC ACID-FAST BACTERIA

Dr. H. SCHWABACHER (London) recalled the wide distribution of saprophytic acid-fast bacilli in dust and water, and the impossibility of differentiating these organisms from tubercle bacilli purely on microscopical evidence. She enumerated the precautions it is necessary to take to avoid the occurrence of saprophytes in films prepared for direct examination.

(*a*) All containers for pathological material should be cleaned with weak soda solution or bichromate mixture, and rinsed out with hot water and finally with glass-distilled water before being sterilised in the autoclave or hot-air oven.

(*b*) The solutions for the Ziehl-Neelsen stain should be prepared with glass-distilled water. Common baths for staining and decolourising are to be strongly deprecated, for floating organisms are caught on negative slides.

(*c*) If the slide is not a new one, it should be passed through a bunsen flame 24 times, each to-and-fro passage occupying about one second. Only complete charring will remove bacilli once they have been thoroughly fixed on glass.

(*d*) The oil-immersion objective should be wiped in case any acid-fast bacilli have become attached to it from the previous film. The oil from the bottle should be allowed to fall on the film, care being taken that the rod does not come in contact with the stained preparation, since otherwise acid-fast organisms may be transferred back to the reservoir.

(*e*) If it is required to rub up material on a slide, a drop of water from a cold water tap should not be used since saprophytes grow abundantly on the mouths of all cold water taps.

The primary colony of tubercle bacilli or acid-fast bacilli usually takes three weeks to become visible on egg medium. This primary colony should be subcultured on to two tubes of egg medium, the one tube to be used for typing purposes, the other tube, together with a subculture on agar medium, to be cultured at room temperature. If growth occurs at 22° C. the strain is a saprophyte. Tubercle bacilli do not grow at room temperature or on agar medium.

For animal inoculation it is usual to inject 1 mg. suspension of a seven- to fourteen-day-old culture intramuscularly into the left thigh of a guineapig and a rabbit. The animals are examined after six weeks and four months respectively. A bovine strain produces progressive disseminated tuberculosis in both animals. A human strain produces progressive tuberculous disease in the guineapig, while in the rabbit it only produces a local lesion at the site of inoculation and isolated tubercles in the lungs—i.e., non-progressive lesions. A saprophytic acid-fast strain will fail to produce lesions other than a local abscess, however heavy the inoculum.

EXCRETION OF TUBERCLE BACILLI IN URINE

Dr. C. E. DUKES (London) defined urinary tuberculosis as a clinical condition characterised by tuberculous lesions in the urinary tract, by the presence of urinary symptoms, and by the excretion of pus and tubercle bacilli in the urine. Tuberculous bacilluria he described as an occult or subclinical tuberculous infection associated with the excretion of tubercle bacilli in the urine but not accompanied by urinary symptoms. These two conditions are both associated with the presence of tubercle bacilli in the urine, but the laboratory findings differ considerably. In tuberculous bacilluria only a few tubercle bacilli are found and it is rare for them to be discovered in stained films of the centrifuged deposit. Guineapig inoculation is nearly always necessary for the demonstration of tuberculous bacilluria. The excretion of tubercle bacilli is intermittent in bacilluria, so that a test may be positive on one occasion and negative on another. The urine looks clear and does not as a rule contain pus or blood, but at the time when the tubercle bacilli are being excreted microscopic examination will reveal an excess of leucocytes in the urine. In cases of tuberculous bacilluria the excretion of tubercle bacilli may cease when the patient's general health improves.

In urinary tuberculosis on the other hand the urine usually contains large numbers of tubercle bacilli and they can generally be found in stained films of the centrifuged deposit. Cultures and guineapig tests are rarely necessary. Dr. Dukes described experiments he has carried out which prove that the excretion of tubercle bacilli is generally constant in urinary tuberculosis. In cases where the bacteria are relatively scarce it is important to examine a concentrated specimen of urine of high specific gravity and containing pus. An early morning specimen of urine is usually best for this purpose. Urinary tuberculosis is almost invariably accompanied by pyuria, and often blood-cells are also present. The excretion of tubercle bacilli continues freely as long as an open tuberculous lesion can discharge into the urinary tract. Dr. Dukes illustrated this by photographs of several dissected kidneys showing tuberculous lesions at different stages of development.

GROWTH-RETARDING POWER OF BLOOD-SERUM

Dr. W. PAGEL (Cambridge) said that he has found no growth-retarding power towards the tubercle bacillus in the blood-serum of approximately 90 per cent. of normal persons and those with the "adult type" of pulmonary tuberculosis—i.e., bronchogenic phthisis restricted to the lungs. On the other hand, he has observed definite retardation of bacillary growth in about 75 per cent. of cases of "chronic disseminated tuberculosis"—i.e., chronic extrapulmonary tuberculosis, such as lesions of the urogenital organs, bones, joints and meninges. He has demonstrated this by a method known as "depth cultures" of tubercle bacilli—namely, mixtures of serum with an asparagin-mineral salt solution and a suspension of tubercle bacilli incubated for 10–30 days. He has tested 236 sera in this way. Growth-retardation occurs generally irrespective of the activity of the lesion, although it is more pronounced in active disease, and it is independent of the individual or species resistance to tuberculosis. The serum factor responsible for the retardation of bacillary growth withstands heating for half an hour at 56° C. It can be absorbed by a wide range of acid-fast organisms and *Bact. coli*, but not by staphylococci and diphtheria bacilli. Absorption is not

stimulated by the introduction of growth-promoting factors such as lytic products liberated from the organism used for absorption, nor is it due to an alteration of serum complement. It is not unlikely that "natural antibodies" (perhaps similar to the β-lysins) are responsible for the phenomenon, because after absorption the bacillary growth is also increased in serum from normal individuals and also because specific vaccination does not confer growth-retarding power on the serum.

RELATION OF TUBERCULOSIS TO SILICOSIS

Dr. A. F. S. SLADDEN (Swansea) gave a statistical summary of pathological examinations of post-mortem lungs from industrial workers supposed to have suffered from silicosis. His analysis dealt mainly with a large group of colliery workers, and, for comparison, with a group of other workers subject to silica hazard, but not to coaldust. He pointed out that in the first group silicosis was commonly found without any demonstrable tuberculosis, and showed that the relative incidence of tuberculous disease in the second group was double that in the first. He referred to other reasons for thinking that a protective factor against tuberculosis exists in coaldust, and put forward the greater frequency of silicosis without superimposed tuberculosis amongst coalminers as an argument in support of this "protective factor."

REVIEWS AND NOTICES OF BOOKS

The Building of a Nation's Health

By Sir GEORGE NEWMAN, G.B.E., K.C.B., M.D. Edin., F.R.C.P., formerly chief medical officer, Board of Education (1907–35) and the Ministry of Health (1919–35). London: Macmillan and Co. 1939. Pp. 479. 21*s*.

NOBODY who has the privilege of Sir George Newman's acquaintance will doubt that for him official retirement does not mean an end of intellectual effort. Should the storm burst he will play his part; if the clouds pass he, like Allbutt and Osler, will employ his leisure in the service of literature. In speaking of his book as a valedictory we certainly do not mean that his public services are concluded. But there is a sense in which this book, a history of events in which the author had a large share, may properly be termed a valedictory address and compared with the utterances of predecessors who had served the state in the same field of endeavour. Of the three great men whom Newman often names—Chadwick, Farr and Simon—one only composed a valedictory on this scale, and all three retired from the public service with a sense of grievance. Farr, like Morant, gave his life to the state. Chadwick and Simon long survived official retirement but their wrongs sometimes coloured their judgments of men and measures. It would be fantastic to suppose that in an official life of nearly thirty years Newman has had no disappointments, never been wounded and never wounded others. But this book reveals no half-healed scars and contains no harsh judgments of individuals.

It is, of course, with Simon's books that this book challenges comparison. Both writers had a literary gift. In their official utterances Simon had greater dramatic force, Newman more urbanity. Simon was more fitted to startle and terrify, Newman to persuade and please. Simon's literary danger was melodramatic violence, Newman's a too easy optimism. In this volume Newman's literary merits are conspicuous and the defects of his qualities unobtrusive; one can easily understand how far more successful he has been than his great predecessors in interesting the general reader. It is of course true that Newman has had a more receptive public than Simon and a sure instinct leads him to emphasise from beginning to end of the book the paramount importance of education, general and technical.

Some readers may think that in a comparatively short book too many pages are devoted to the history of education. They will be in error. Not only a properly educated medical profession but a properly educated electorate are necessary and almost sufficient conditions for sanitary reform. In speaking of the decline of infant mortality Newman puts the greatest stress not upon specific sanitary reforms but upon the education of the mothers. "Several million mothers became 'child-conscious.' It was this almost universal *maternal awakening* which really began to change the outlook of child health—as every alert medical officer of health knew in his own district between 1904 and 1910." It is said that Simon de Montfort, watching from Evesham tower the advancing troops and noting their soldierly bearing and formation, said "I taught them that." The youngest and therefore harshest critics of the "optimism" of the Ministry of Health and of the Board of Education in recent years might have railed against but could not have criticised the Ministry without some technical knowledge. Newman, directly in his reports and indirectly through the lay journalists who read his reports (a compliment never paid to the writings of Farr and not often paid to those of Simon), has been a great educator.

In successive chapters Newman reviews the organisation and training of the medical profession, the development of the Ministry of Health, the awakening of the local authorities. These are concerned with matters of general principle and have a logical connexion. The next three chapters treat in detail of the problems of school life. Then the mother and her infant, the nutrition of the people, the welfare of the industrial worker, health insurance and medical research are studied. The last chapter is a biographical sketch of Robert Morant. It may be true that the order of the later chapters of the book is not logical but one has the advantage that each chapter is complete in itself. A layman could read almost every word of the book with pleasure and profit and there are very few medical men whose knowledge will not be enlarged by its perusal. As we have already hinted, its literary style is mellower than that of the reports and fully justifies Newman's decision to write a new book and not reprint his papers.

No doubt many too young to have personal knowledge of sanitary conditions fifty years ago, and even some older people exasperated by the bad side (always so much easier to recognise than the good side) of civil-service mentality, will chafe at the easy, urbane flow of the narrative, will find it reminiscent of the eighteenth century. It is not that there are no shadows in the picture—Newman has not failed to mention present defects and evils—but undoubtedly the landscape is sunny. In this time of A.R.P., distressed areas and general gloom has anyone the right to be bland and optimistic? That is the question one illogically asks oneself. But it is quite

irrelevant. Newman was not writing a history of modern society but of public-health administration and its relation to the bodily health of our people. The story *is* one of progress. Nobody old enough to have had medical experience of (say) East London in the last decade of the nineteenth century will have any doubt on the matter. Newman not only had the right, it was his duty to dwell upon the good side of our recent history.

In this exhibitionist era valedictories are legion and there is always a welcome for "revelations." It would have been very easy for Sir George Newman to follow many precedents and cast himself for the rôle of the Wise Man hampered by politicians and lay administrators. He has chosen a better part and written a book worthy to stand on the shelf next to "English Sanitary Institutions" and sure to be much more frequently consulted.

Thorpe's Dictionary of Applied Chemistry

(4th ed.) Vol. II (Bl— Chemical Analysis). By JOCELYN FIELD THORPE, C.B.E., D.Sc., F.R.S., F.I.C., professor of organic chemistry and director of organic laboratories, Imperial College of Science and Technology, London; and M. A. WHITELEY, O.B.E., D.Sc., F.I.C., lately assistant professor of organic chemistry at the college. London: Longmans Green and Co. 1938. Pp. 711. 63*s*.

THE second volume of this large and valuable work shows little change in policy from that pursued in the first. A large number of experts, representing many branches of science, have contributed a remarkable variety of articles to this volume. Many of them are of special value and interest to workers in the medical sciences, such as those on blood, carbohydrates, cardiac glycosides, carcinogenic hydrocarbons, carotene and carotenoids. We confess to have got most entertainment from the fascinating and informative sections on blacking, brandy, bread, brewing and butter. No less than 170 pages are devoted to a small treatise on chemical analysis which cannot be said quite to fall between two stools, since it describes briefly the methods it recommends, and mostly gives at the same time the appropriate references to original sources. This section is well up to date, including most of the new techniques which the analyst has applied to his work in recent times. Much of the space in this volume is assigned to pharmaceutical subjects. For a work of reference this makes unusually good reading; it is attractive both in appearance and in substance.

Tropical Medicine

(3rd ed.) By Sir LEONARD ROGERS, K.C.S.I., F.R.C.P., F.R.S., late medical adviser to the India Office; and Sir JOHN W. D. MEGAW, K.C.I.E., M.B., medical adviser to the India Office. London: J. and A. Churchill. 1939. Pp. 544. 16*s*.

THE authors of this book have both had great experience in the tropics and can therefore tell the student and the medical man what he really needs to know. They classify diseases in accordance with their causal agencies, occasionally changing their plan when a clinical classification would be more helpful. Thus there are sections on the febrile diseases due to protozoa, spirochætes, viruses, rickettsia bodies, bacteria and helminths, and another grouping the diarrhœal diseases together. Snake poisons, dietetic diseases, diseases associated with physical agents, and the incidence of general disease in the tropics all receive notice. The use of the microscope in routine tropical practice, often omitted from clinical textbooks, is here dealt with thoroughly, and rightly so, since the man who tries to practise in the tropics without this instrument is literally and metaphorically working blindly. The revision and proof-reading seem to have been somewhat hurried, for there are a number of minor errors. The book, which is well illustrated with diagrams, photographs and maps, winds up with some general remarks on the diagnosis of fevers and the recording of cases.

Klinische Chemie und Mikroskopie

By Dr. LOTHAR HALLMANN, director of the biochemical and bacteriological department of the Städtisches Kaiser-Friedrich- und Kaiserin-Friedrich-Kinderkrankenhaus, Berlin. Leipzig: Georg Thieme. 1939. Pp. 387. R.M.12.

THIS book deals with clinical chemistry and microscopy in a full and detailed manner, but on blood-analysis it is a little out of date, since many of the techniques described have now been superseded by more recent American methods. The book, however, is not likely to appeal much to English readers who are already well supplied with literature in their own language on these subjects.

Classic Descriptions of Disease

(2nd ed.) By RALPH H. MAJOR, M.D., professor of medicine, University of Kansas school of medicine. Springfield, Illinois: Charles C. Thomas. 1939. Pp. 727. 27*s*.

Prof. Major compiled his anthology partly because he is interested in the "actual words" of our predecessors, and partly to enable teachers to bring to the notice of students the first records of much that is now routine knowledge. Those who have the leisure and the taste for gleanings from the past will appreciate the contents but will regret some omissions. Thus Prof. Major gives us Thucydides's brilliant account of the plague at Athens, but does not set beside it the equally fine passage in the sixth book of Lucretius on the same theme. He gives us Kircher on contagion, but not Henle on miasmata and contagion. But it is churlish at so ample a feast to complain of the absence of particular dainties. The good things set before us include Corrigan on Corrigan's pulse; Graves and Basedow on the disease to which either of their names may be attached; Heberden on angina pectoris and on nodes; Nicholas Tulp on diphtheria and on beriberi; and passages from the works of Morgagni, Vieussens, Laennec, Corvisart, Auenbrugger, Schönlein, Caius, Sydenham, among scores of others of greater or lesser note. The biographies preceding the excerpts are terse, accurate and scholarly, and sometimes amusing. The brief notice of Nicholas Tulp notes his success in psychotherapy: "he is said to have cured Rembrandt by suggestion of a mental disease which caused the famous painter to believe that his bones were turning into jelly." The paper on Devonshire colic will remind readers of the careful experiments and masterly reasoning by which Sir George Baker discovered that lead poisoning was the cause of this condition. The volume contains much that will be treasured by those interested in medical history. It is perhaps a small thing to set against its merits that though this is a second edition there are many misprints, misspellings and minor errors of printing and punctuation.

THE LANCET

LONDON: SATURDAY, JULY 15, 1939

THE WATERED MILK BILL

THE Milk Industry Bill presented to the House of Commons in November, 1938, embodied a long-term policy for the production and distribution of milk based on a well-known white-paper. This bill was withdrawn in February and the new bill, which was read a second time on Friday of last week, was unfeelingly but aptly compared by a Labour member to the feat of a noble duke who marched his men up a hill and then marched them down again. The new bill has avoided controversy by omitting all its important provisions. It no longer provides for a milk commission to keep the industry under review and to tender advice when needed, and with this omission disappears also the power to spend money on research and education; gone is the regulation of imported milk and milk products; gone is the power to make pasteurisation orders and to prevent the sale of unpasteurised milk; gone are the schemes to reduce the cost of distribution. The first and last of these omitted provisions might have done much to reduce the present high cost of milk to consumers; the third was an overdue step towards making milk safe to be consumed. All that is left (excluding minor matters) is extra payment for what is called quality milk, the authorisation of cheap milk for the school population and the extension of the provision for mothers and young children, and the Exchequer grant for milk used in manufacturing butter and cheese.

The proposed concessions are in all essentials similar to those in the first bill. The payments for quality milk, of which a material part is to be borne by the Exchequer, are still subject to the criticism that "accredited milk," with a bonus of $1\frac{1}{4}d.$ per gallon ($\frac{3}{4}d.$ from the Exchequer), is neither safe from conveying tubercle bacilli nor from being a vehicle of other pathogenic organisms. It is difficult to see the wisdom of a state contribution towards the production of a quality of milk which, although admittedly cleaner, is little safer than ordinary milk from the risk of conveying disease. These proposals are however to operate only from Oct. 1, 1938—i.e., retrospectively—to Sept. 30, 1940. The cheap-milk schemes have the same interim character. They were welcomed by the medical profession when first introduced and will be again acclaimed, but with the same reservation as regards safety. The new bill leaves entirely unsatisfied the unanimous claim of the leaders of the medical profession, which is also the policy of the Ministry of Health, that the milk-supply of great Britain should be made safer. The milk industry cannot flourish so long as this expert opinion is flouted. The only grain of satisfaction is that the present bill is a temporary measure and only postpones for a short spell the realisation of a long-term control of the industry designed both to lower the price of milk and to limit its capacity to convey disease.

THE STOMACH IN PERNICIOUS ANÆMIA

Two historical observations. In 1870 FENWICK [1] demonstrated structural atrophy and impairment of function in the gastric mucous membranes of patients dying of pernicious anæmia. In 1929 CASTLE [2] demonstrated, in patients with pernicious anæmia, the lack of a hæmopoietic substance ("intrinsic factor") normally present in gastric juice. Reasonable deduction: Fenwick's atrophy is responsible for the deficiency of Castle's factor. But that simple putting of two and two together to make four has proved unexpectedly difficult. For MEULENGRACHT [3] has shown that in the pig the anti-anæmic factor is to be obtained from the pyloric end of the stomach and the duodenum, but not from the body of the organ; while both he,[4] and MAGNUS and UNGLEY,[5] have recently made it quite clear that the histological abnormalities in the pernicious-anæmia stomach—call them gastritis or atrophy, or both—are conspicuous in the body of the stomach and virtually absent in the pyloric glands and the related duodenal glands of Brunner. It is not obvious how structural change in the body of the stomach can explain functional disturbance in normal-looking antrum and duodenum. It may be that the pig differs from man, and that the intrinsic factor arises in the former in the pyloric region, in the latter in the body. The anatomical similarity between the two species, however, makes this unlikely, and MEULENGRACHT prefers to suggest other reconciliatory hypotheses: that the pyloric and Brunner glands, like the islets of Langerhans, can fail in function while structurally intact; that they require activation by a hormonal product of the mucosa of the body of the stomach, much as the pancreas requires secretin; or even that the main disturbance in ordinary pernicious anæmia is more a failure of intestinal absorption of the anti-anæmic product than a failure of production of one of its factors.

Hitherto the gastric atrophy has usually been looked on as extensive and irreversible. This has perhaps been too readily inferred from the well-established fact that the gastric mucosa in treated cases practically never recovers the power of secreting acid. The proof of the matter lies with the pathologists, but their opportunities of examining well-fixed stomachs of pernicious-anæmia patients dying in remission have not yet been numerous. Meanwhile the gastroscopists have entered the field, and the claim of JONES, BENEDICT and HAMPTON [6] to have demonstrated regeneration

1. Fenwick, S., *Lancet*, 1870, **2**, 78.
2. Castle, W. B., *Amer. J. med. Sci.* 1929, **178**, 748.
3. Meulengracht, E., *Acta med. scand.* 1934, **82**, 352.
4. Meulengracht, *Amer. J. med. Sci.* 1939, **197**, 201.
5. Magnus, H. A., and Ungley, C. C., *Lancet*, 1938, **1**, 420.
6. Jones, C. M., Benedict, E. B., and Hampton, A. O., *Amer. J. med. Sci.* 1935, **190**, 596.

of atrophic gastric mucosa in treated patients has been followed by a more extensive study from SCHINDLER, who is one of the parents of the modern gastroscope. It concerns 23 patients with well-attested pernicious anæmia. In most of those who were untreated SCHINDLER and SERBY [7] saw the well-known and easily recognised atrophic features—thinness and greying of the mucosa and visible fine red branching vessels. In some the atrophy was extensive, in others only patchy and discrete; it usually affected the body of the stomach, but in one case was most marked in the antrum; and in another case SCHINDLER satisfied himself that no atrophy, only a superficial gastritis, was present. Many of the patients were re-examined after some months of liver treatment, when their blood-pictures had returned to normal. Four of them showed little change; in one the atrophy had advanced; in four or five the gastric mucosa presented a normal appearance. If this be accepted it will reconcile the discrepancy between the claim of JONES, BENEDICT and HAMPTON, and the failure of HARTFALL [8] to find any convincing gastroscopic evidence of regeneration during remission under treatment. Both seem to be right, and the stomach may sometimes (but not always) behave like the smooth glossy tongue, which recovers its pile when liver is given. But this does not simplify the pathogenesis of pernicious anæmia. It forces SCHINDLER and SERBY to the assumption that in this condition two separate disorders of the stomach are present: first a dysfunction of the cells producing Castle's intrinsic factor; and secondly a degenerative and inflammatory change in the gastric mucosa which, sometimes at least, recovers under liver treatment and therefore may be attributable to a deficiency state. To these may be added a third disturbance, the achlorhydria, which accompanies the first. SCHINDLER and SERBY do not consider the alternative possibility that the atrophy of both tongue and stomach may be due to the prolonged anæmia itself, for both may be found in the common hypochromic anæmia due to iron deficiency; the gastric atrophy—as judged by the gastroscope—might be reversible in the less advanced and irreversible in the more advanced cases. That view has at least the merit of simplicity, and should be refuted before a new specific deficiency is invoked.

THE HOLIDAY

THE decision how we shall spend our holidays often represents a compromise in which our individual choice may have played only a minor part. Custom, the claims of children, international tension, familiar problems of time and money—there are many constraining influences upon personal wishes. But it is doubtful what our personal wishes and wants are. Many of us, about to go on holiday and having nothing to consider but our more selfish desires, can hardly be sure what it is that we want of the holiday. Is it to be idleness or activity, or perhaps an alternation of each? Shall our activity be as different in kind as it can be from our daily work? If we are people who work with our heads all the year round, shall we now pile up the lactic acid and the stiffness by physical exertion and let the cortex rust? Shall we ride a hobby or a horse, cultivate our æsthetic leanings or our gardens? Not all who make their choice in these matters are confident beforehand, or afterwards, that this is the ideal holiday they have chosen. "Change of scene" is an old prescription and "rest" is an older one—as old as the sabbath. But change of scene is nowadays interpreted as a psychological, not a geographical and climatic affair; and rest is a qualified notion, implying rest (i.e. change) from one's usual activities rather than the utter rest of quasi-stupor.

It might be expected that the psychologists and psychiatrists would have something to say about all this; the psychology of industry has had much occasion to study the need of rest and the forms rest should take, and the psychiatrist is continually dealing with jaded people. Ordering people away for the sake of their nerves has been a well-known function of the physician. But it is decidedly unusual in our days for the psychiatrist to advise a sea-voyage—or travel of any kind—as a remedy for the surfeit and weariness of neurotic depression. He may, it is true, occasionally think that the sympathetic stimulation of mal-de-mer will have the salutary effects attributed to it in the treatment of schizophrenia by sages of the past (and the present), but in general it is not change of scene as an end in itself that is of value in his eyes but rather change of milieu (such as might even be attained while one stayed at home) whereby one escapes from emotional bonds and complexities, from harmful associations, reminders, habits. The psychiatrist is not concerned to get the patient away from himself but rather to create the conditions in which he may return to himself, give freedom and expression to inhibited or thwarted inclinations: the standpoint is more that of Rousseau than of the Scarlet Pimpernel. When the psychiatrist advises his patient to enter a nursing-home or clinic it is not for Weir Mitchell treatment—that negation of activity, that winter holiday of the dormouse—but for a regimen in which every hour is planned and occupation more conspicuous than recreation. Often the psychiatrist sees that it is the very breadth of choice open to the irresolute patient that has been beguiling and bothering him; his days must be arranged for him, occupation imposed upon him, sometimes with no more coöperation on his part than he gives to his dietary or medicinal regime. Sometimes the occupation proposed will be close to the patient's work in ordinary life, so that he is not called on for the effort of acquiring a new skill; sometimes it will be remote and will demand effort and patience both from him and his teacher-therapist. The psychiatrist has not yet worked out the principles on which his occupational therapy rests and by conscious application of which he can prescribe it; it is useless to appeal

7. Schindler, R., and Serby, A. M., *Arch. intern. Med.* 1939, **63**, 334.
8. Hartfall, S. J., *Proc. R. Soc. Med.* 1939, **32**, 527.

to him to tell us how far they are applicable to the holidays, salutary or therapeutic or prophylactic in intention, which healthy people take. The same is true of "recreational therapy," now increasingly employed in the treatment of the mentally ill, but still without precision. At all events such things as private worries and desires, occupational and social troubles, temperament, opportunity and training make any simple or general rule impossible, whether it be for the treatment of the sick by clinic-holidays or for the healthy man walking into Cook's to book his berth.

The physical advantages of a holiday are obvious but do not always run parallel with the psychological ones. In the latter it is freedom from insistent anxieties and restraints that works most efficiently. Contentment in what one is doing on the holiday, whether it be yachting or learning Chinese; release from irksome conventions and ties; freedom to follow one's bent (towards dirt or dilatoriness, floating or diving)—these will be more potent than change of air. Indeed, if vocational guidance, mental hygiene and our social system had all attained perfection, we should find in our daily working lives, as a few lucky dogs do, such satisfaction and freedom that holidays would be superfluous. There will be no holidays in heaven.

ANNOTATIONS

THE PROCESS OF AGEING

WITH the steady increase in the average age of the population the physiology of age becomes more and more important, yet its study is still largely neglected. The healthy young adult can no longer claim to be typical of the human race, but must give place to the man of 35. The great problem in nearly every aspect of ageing is to differentiate pathological processes from those due to time alone; the longer an organ or tissue lives, the more likely is it to suffer from trauma or infection. A remarkable study [1] of the biological and medical aspects of ageing made by Professor Cowdry of Washington University, St. Louis, and others, deals not only with every part of the body but with the mind as well. The early chapters on plants, protozoa and insects show how fundamental are the problems to be tackled. In some of the chapters "ageing" is interpreted as meaning any change taking place with time, the twenty-six authors having insufficient material on which to base conclusions about advanced age. Occasionally indeed the object of the book seems to have been forgotten for a paragraph or two, but this is in keeping with one of the two strong impressions gained by the reader. The first of these is that here we have an anatomical-physiological study of the body by a number of persons of many and diverse interests, and, quite apart from the object of the work, the result is an extraordinarily interesting collection of facts presented in quite a new way. It would be difficult, for instance, to find in any ordinary textbook such an informative chapter as that on lymphatic tissue, yet the facts given are not of such a type as one would expect to have to search for in special places. The book might with advantage be combed by teachers of anatomy and physiology for points which they have overlooked or about which they thought nothing was known. The second impression is one of surprise that so much research has been done on the question of age from one aspect and another, and that so much knowledge has already accumulated—much of it of direct interest to the doctor who too often feels that in the treatment of elderly patients he has to lean too heavily on his personal experience and certain vague traditional ideas. The book has been deliberately produced in order to foster scientific interest in the subject of normal ageing, and one of its objects is to demonstrate the large gaps which still exist. The study is timely from the scientific point of view in that a suitable moment has been chosen for a stocktaking of existing knowledge, and from the sociological point of view in that everyone is now "population-conscious."

1. Problems of Ageing: Biological and Medical Aspects. Edited by E. V. Cowdry, professor of cytology, Washington University, St. Louis. London: Baillière, Tindall and Cox. 1939. Pp. 758. 45s.

COLOSTRUM AND IMMUNITY

ALMOST every textbook of obstetrics and pædiatrics mentions vaguely that one of the functions of colostrum is to convey immunity to the newborn baby, but scientific evidence of this important fact, if indeed it is a fact, is scanty, and experimental work in the veterinary world is not necessarily applicable because anatomical differences in the formation of the placenta in different species introduce the difficulty of distinguishing between immunity transferred through the placenta and through the colostrum. Schneider and Szathmary [1] have now studied the antibodies in the colostrum of cows and in the blood of newborn calves. By inoculations they raised the immunity of pregnant cows to 170 diphtheria antitoxin units per c.cm. of blood and an antityphoid titre of 1 in 100. At this stage colostrum was withdrawn and found to contain 1400 units of antitoxin and an antityphoid titre of 1 in 5000. Roughly speaking then, at this stage of pregnancy 1 c.cm. of colostrum is equivalent to 10–50 c.cm. of maternal blood-serum as regards its antibody content. Immediately after birth and before being allowed a feed calves from these immunised cows were found to have less than 0·02 unit of antitoxin per c.cm. of blood-serum and no trace of typhoid agglutinins. Within ninety minutes of the first feed of colostrum, however, the antitoxin content of the calves' serum had risen to 0·25 unit per c.cm. and an agglutinin titre of 1 in 1. After twenty-four hours of normal feeding the antibody content of the calves' blood was about 30 per cent. of that of the maternal serum. By this time ordinary milk was being secreted, which only contained negligible amounts of antibodies as compared with colostrum.

These results confirm the eminently practical effects obtained in the prevention of lamb dysentery, whereby the ewe is inoculated with a vaccine and immunity is conferred on the lamb provided that an early colostrum feed is allowed. How far these results could be applied to human medicine cannot be estimated for lack of data. Clearly the primitive nature of the bovine placenta prevents any transplacental interchange of serum-proteins, whereas this

1. Schneider, L., and Szathmary, J., *Z. ImmunForsch.* 1938, **94**, 458.

is not true of the human placenta. The matter is capable of relatively easy determination, for example, by estimating the diphtheria antitoxin content of maternal serum, colostrum, and the serum of the newborn human baby. The mechanism whereby the bovine lactating tissue mobilises, concentrates or synthesises antibodies for excretion in the colostrum also demands careful study. Finally, the absorption of immunising substances from the gastro-intestinal tract in the calf and lamb opens up another field of experiment in the human subject, in whom it has become routine practice to give immunising agents parenterally. The question "does colostrum really matter?" is one which pædiatricians would like answered.

THE FRONTAL LOBES

OPINION regarding the importance of the frontal lobes for the life of the mind has fluctuated during recent years. The recognition that tumours involving the frontal lobes are apt to produce severe mental changes led to the belief that this part of the brain was concerned in some special way with mental function. Later it was appreciated that such changes were probably in part remote effects of the tumour. The increasingly radical measures of neurosurgery have provided the opportunity of observing the effects of unilateral and even of bilateral frontal lobectomy in man and of comparing the human reaction to such cerebral amputation with that of experimental animals. Recent writers, notably Penfield and Jefferson, who have studied the results of unilateral frontal lobectomy have tended to stress the slightness of the consequent mental symptoms, and Jefferson has argued that the frontal lobe has no functions for the mental life that are qualitatively different from those of any other part of the brain.

Dr. Gösta Rylander[1] of Denmark has studied the effects of unilateral frontal lobectomy in 32 cases. His psychiatric outlook has enabled him not only to make an exceptionally thorough psychological investigation of his patients but also to assess the shortcomings of individual tests. He lays stress on the importance of the patient's preoperation personality and carefully avoids dogmatism, pointing out that symptoms are often capable of more than one psychological interpretation. His investigation shows that skilled psychiatric examination reveals a fairly constant change both in the intellectual and emotional spheres in patients in whom one frontal lobe has been removed. The emotional changes consist of a diminished inhibition of affective responses and a displacement of the habitual feeling level, in most cases towards euphoria. In the volitional sphere restlessness and deterioration of initiative and interest are characteristic. The intellectual changes involve mainly the higher faculties.

TREATMENT OF SERUM SICKNESS

BOTH the incidence and severity of serum reactions have diminished sharply since the introduction of concentrated therapeutic sera. The common type of reaction encountererd nowadays consists of a generalised urticarial rash with or without constitutional disturbance—an event which may prove extremely irritating to the patient but does not endanger life. When the need for antitoxin is urgent, as in diphtheria, the possibility of reaction must not be allowed to interfere with specific treatment. In non-lethal diseases, however, such as mild, or even moderate, scarlet fever there is a natural inclination to weigh the advantages of serum therapy against the chances of serum sickness—from the patient's point of view the cure may seem worse than the disease.

None of the remedies so far advocated for the control of serum sickness have proved more effective than the subcutaneous injection of adrenaline chloride in combination, if necessary, with ephedrine by mouth. Foshay and Hagebusch,[1] working on the hypothesis that the major phenomena of serum sickness are due to histamine or a histamine-like substance, have sought to control it by administering an inactivating ferment obtained from the intestinal mucous membrane (histaminase). This compound, in the form of enteric-coated tablets, was given to a preliminary series of 8 cases of serum sickness, but the results were rather inconclusive, presumably because of irregularities in absorption. Accordingly a further 13 cases were treated with an injectable form of histaminase either alone or in combination with tablets by mouth. These patients, suffering variously from the effects of horse serum (8 cases), antitetanus serum (4 cases) and scarlatinal antitoxin (1 case), were all relieved to a considerable extent, but in more than half of them the benefit was not apparent for at least eighteen hours—long enough to introduce the possibility of natural recovery. In an attempt to determine the prophylactic value of histaminase 8 patients were treated on the day before and for a certain time after the administration of different types of antitoxic sera. Only 2 patients developed serum reactions, and these were very mild, which suggests that histaminase did have some preventive effect, though to be at all conclusive a longer series would be necessary. Meanwhile reactions may become negligible through the wider use of more recent methods of serum concentration and refinement. Bradshaw's[2] incidence of 1·2 per cent. of reactions in a series of 793 injections of refined (predigested) scarlatinal antitoxin certainly encourages this hope.

A PIONEER IN BIOCHEMISTRY

FIFTY years ago died one of the first scientists to draw attention to the chemistry of urine—George Owen Rees, scion of a Welsh family whose ability has won them several niches in the "Dictionary of National Biography." Thus, his great-grandfather was Owen Rees, a nonconformist minister; his grandfather was Josiah Rees, a Welsh presbyterian minister; an uncle, Owen Rees, migrated to London and became a partner in the publishing firm of Longmans; and another uncle, Thomas Rees, at first in trade as a bookseller, later became a unitarian minister and a voluminous writer on theological and historical subjects. A third of these brothers, Josiah Rees, was a Levantine merchant and was appointed British consul at Smyrna; he married an Italian woman, by whom he was the father of George Owen, another son, and a daughter.

George Owen Rees was born in 1813 and was apprenticed at Guy's Hospital in 1829. In 1836 he studied botany under Sir William Hooker, took his M.D. Glasg., and returned to start practice in London. An account of his activities is given in *Guy's Hospital Reports* for January. His ability attracted the attention of Bright, Swayne Taylor, Roget

1. Personality Changes after Operations on the Frontal Lobes. By Gösta Rylander. London: Humphrey Milford, Oxford University Press. 1939. Pp. 327. 15*s*.

1. Foshay, L., and Hagebusch, O. E., *J. Amer. med. Ass.* June 10, 1939 p. 2398.
2. Bradshaw, D. B., *Lancet*, July 1, 1939, p. 6.

(secretary of the Royal Society and author of the famous "Thesaurus"), and Brodie, on whose recommendation he was appointed medical officer of Pentonville. In 1836 he published "On the Analysis of the Blood and Urine in Health and Disease," one of the earliest works on biochemistry. In 1838 he demonstrated hyperglycæmia in diabetes, being the first to make a quantitative estimate of blood-sugar. Results of his team-work with Bright on Bright's disease were published in *Guy's Hospital Reports* in 1843, with an appendix by Rees on "Observations on the Blood with reference to its peculiar condition in morbus Brightii." He had previously helped Bright in his work on jaundice. For many years he assisted Swayne Taylor in his toxicological work, giving evidence in the Palmer and other celebrated trials. Rees gave the Goulstonian lectures in 1845, the first Lettsomian lecture at the Medical Society of London in 1850, the Croonian lectures in 1856, and the Harveian oration in 1869, in which he suggested that "nerve force" might be analysed with the help of chemistry (see *Lancet*, 1869, **2**, 26).

George Owen Rees died of cerebral hæmorrhage on May 27, 1889. He never married, having devoted his life to science and to the support of his impoverished mother, brother, and sister.

THE ALMONER AT THE V.D. CLINIC

THE post of lady almoner to a clinic for venereal diseases is one that calls for exceptional gifts. The patients who attend such a department are in general far from being the moral outcasts and degenerates that the public, and only too many of the medical profession, believe them to be. Usually they are ordinary human beings in serious trouble who are abnormally resentful of prying interference but highly responsive to sympathetic understanding. The almoner's work, therefore, has many pitfalls and many discouragements, but also many compensations to one endowed with a proper understanding and trained in the right methods of approach. Miss Manchée writes[1] from considerable experience at St. Mary's Hospital, and her book is full of useful information for those who would tread this thorny path. The introductory chapter by the medical director of the clinic at St. Mary's gives a concise summary of the main facts about the venereal diseases and their treatment which the almoner should know—knowledge which is essential in her work but is ordinarily hard to acquire. Succeeding chapters deal with the general duties of an almoner, and the work of record-keeping, and contain much tabulated information about treatment centres, special hospitals and organisations. Others are devoted to the particular problems of following-up, of maternity patients and of infected children. Miss Manchée's personal views are sound and instructive, but may be open to criticism on points of detail.

She rightly emphasises that the first interview is the most important; but it may be argued that the patients need not be questioned as to both medical and social circumstances *before* seeing the medical officer. Many would resent such cross-questioning, although they would be willing to give particulars to the medical officer or later to the nurse who is giving treatment; after which, if help is needed, they could be referred to the almoner. Then there is the difficult question whether a visit should be the final step in following-up when letters remain unanswered. As Miss Manchée says, "untold harm can be done through thoughtlessness or over-zealousness" and many would regard such visits as a serious manifestation of excessive zeal, except perhaps in the occasional case where a child's health is being jeopardised by parental carelessness or ignorance. In all these situations wise restraint is the first essential, and the almoner who is over-active will do more harm than good. To those who possess the necessary qualities and would attempt this difficult task, the present book is likely to be a substantial help.

1 Social Service in the Clinic for Venereal Diseases. By Dorothy Manchée. London: Baillière, Tindall and Cox. 1938. Pp. 91. 3s.

A FRIEND OF CHILDHOOD

Miss Clara Andrew, who died last week, had an idea in 1914 and spent the remaining 25 years of her life in working it out. The idea was to give childless couples the opportunity of bringing up children who had no proper homes of their own. It started with her Belgian refugee work but soon broadened in the atmosphere of war-time generosity. She had little difficulty in finding permanent homes for war orphans and then set about protecting not only the adopted children but also the adoptive parents from later interference. The act of 1926 giving both parties legal status is now a commonplace; it was actually the result of long and patient labour, and Clara Andrew was not content to leave it there. She helped to obtain the appointment of a departmental committee to consider further safeguards and its recommendations are now awaiting royal assent. It has been said that she found homes for more than 6000 children, of whom no more than 30 proved misfits. This was in itself no mean achievement; but she did more than this, for she and her co-workers have almost redeemed the phrase "baby-farmer" from its terrible associations.

ERRORS IN THE DIFFERENTIAL BLOOD-COUNT

MANY American hæmatologists have claimed that more accurate differential cell-counts are obtained when the smears are made upon cover-slips than when they are prepared on slides. Boveri[1] has accordingly undertaken some comparative studies of white cells by the two methods. These comprised differential counts on himself on twenty-six days at approximately the same hour of the day. Two films were made on slides, four films (two pairs of films) on cover-slips. On each of the two slide films 600 cells were counted, making 1200 in all, and on each of the four cover-slips 400 cells, making 1600. At the same time as a check the lymphocytes were counted in a Buerker chamber against the remaining types of cells taken together. It was thought that the percentage of lymphocytes obtained in this way would represent fairly accurately their percentage in the original drop of blood. The lymphocyte-counts obtained from the cover-glass counts and the Buerker-chamber counts agreed closely, the average difference being only 0·5 per cent. The lymphocyte percentages obtained from the slides were constant and higher by approximately 10 per cent. In other words the lymphocyte percentage ranged between 20 and 30 by the counting-chamber and cover-slip technique and between 30 and 40 with the slide method. There was little to choose between the two methods as far as consistency. For the slides the average difference was 2·15 per cent. and for the cover-glasses 2·2 per cent. The high lymphocyte-count is due, Boveri believes, to the tendency of granulocytes and monocytes to congregate near the

1. Boveri, R. M., *Guy's Hosp. Rep.* 1938, **89**, 112.

edges and ends of the film. He thinks it difficult to compensate for this by counting in a standard way that includes representative portions of the film. He concludes that the cover-glass method is the best, for it alone gives a differential count that correctly represents the relative proportions of the different types of white blood-cells in the original drop of blood. It is not, however, easy to carry out, and is therefore unsuitable for anyone but a highly trained worker. He suggests that in hospitals, where blood examinations must often be made by the inexpert, it is wiser to sacrifice precision to uniformity. The slide method should, he thinks, be used for routine purposes, remembering that the normal lymphocyte percentage then ranges between 25 and 40.

TISSUE RESPIRATION

AT the Dundee meeting of the British Association, to be held from Aug. 30 to Sept. 6, the sections of chemistry and physiology will jointly discuss tissue respiration. The opener, Prof. R. A. Peters, F.R.S., will be followed by Malcolm Dixon (Cambridge) and H. Theorell (Stockholm) speaking respectively on catalysis and the flavoproteins. After an account of cytochrome and similar compounds by Prof. David Keilin, F.R.S., F. Dickens (Newcastle-on-Tyne) will consider the interpretation of intermediary metabolism from measurement of tissue respiration, and J. H. Quastel (Cardiff) that of narcosis. S. Ochoa (Cambridge) will deal with carbon-dioxide evolution and cocarboxylase. Prof. H. S. Raper, F.R.S., will discuss the control of tissue respiration, and other aspects of the subject will be presented by D. E. Green (Cambridge), Sir Gowland Hopkins, F.R.S., H. A. Krebs (Sheffield), T. Mann, and E. P. Poulton (Guy's Hospital).

OPIUM AND CODEINE

ATTENTION has from time to time been called in these columns to the use of codeine as a drug of addiction and the question of extending to it and its salts certain provisions of the 1931 convention for limiting the manufacture and regulating traffic in the drug. The matter has again been under the consideration of the council of the League of Nations and of its advisory committee on opium traffic. Codeine was included in the first draft of the Hague Opium Convention of 1912 but was finally omitted under pressure from the German delegates. Representations from Canada that codeine appeared to be replacing morphine among drug-addicts and restrictions placed upon its use in certain countries, such as Poland and Switzerland, led the advisory committee of the League to draft a protocol for bringing dihydrocodeine and its salts under control like other dangerous alkaloids. This draft has been communicated by the Secretary-General to governments, and their observations have led to the preparation of a revised draft which the council of the League has recently approved for consideration by a conference about to be summoned.

The advisory committee was in session during May and June when Major W. H. Coles (United Kingdom) was elected chairman and Sir Thomas Russell, Pasha (Egypt), vice-chairman. The other nations represented were Belgium, Bulgaria, Canada, China, France, Greece, Hungary, India, Iran, Mexico, Netherlands, Poland, Portugal, Siam, Switzerland, Turkey, United States and Yugoslavia. Sir Malcolm Delevingne and M. A. L. Blanco (Spain) also attended, the former in the capacity of an expert and the latter as an observer. Besides the usual progress report and the returns of illicit traffic and seizures the committee further considered the alarming situation in the Far East and the fundamental question of the limitation of cultivation of the opium poppy and of the production of raw opium.

BLOOD-DONORS COMING IN SLOWLY

DURING the first three days of the appeal for volunteer blood-donors some 5000 people registered as willing to contribute blood in the event of a national emergency. This has been regarded as a good or a bad beginning according to the commentator's forecast of future progress. Certainly the start has been unnecessarily slow, but later figures show a quickening response. If war broke out at least 100,000 donors would be required in London alone and the empanelling centres are in a position to test and register at least 30,000 volunteers a day. It does not need a prophet to be sure that if an emergency arose blood-donors in sufficient number would at once be forthcoming, but an adequate supply of blood of the proper groupings could not be made immediately available. It might be well for practitioners all over the country to impress their patients and others with the fact that now is the time to do it—in the words of the prescription, *tuto cito jucunde*. There may be an understandable reluctance to face a situation that may not and should not arise; but at least there need be none of the present hesitation as regards risk to the volunteer. Long experience has shown that occasional giving of blood is harmless to donors, and all that is asked of them in peace-time is the surrender of two or three drops for testing. It is here that the family doctor's assurance would count for much. The list of blood-transfusion and empanelling centres which has now been issued shows the very large number of places at which the volunteer can register any day in the week except Sunday, from 10 to 12 and from 5 to 8 o'clock. In London itself there are 51 such centres; in the home counties, 36; in provincial centres, 41 (with, in Liverpool, all the Ministry of Labour offices); in Scotland, 12; and in Wales, 4. In London the address of the nearest empanelling centre can be obtained at any post office, or by telephoning Central 8691.

BORNHOLM DISEASE

THE disease variously known as Bornholm disease, epidemic pleurodynia and acute epidemic myalgia is a comparative newcomer to the medical world. References to it are found as early as 1856, but it was first systematically described in 1930, when an epidemic was reported from the Danish island of Bornholm. Since then there have been outbreaks in various countries and the clinical picture is now firmly outlined, though the ætiology remains unknown. Weterings,[1] who reports three cases from Holland, points out the similarity between Bornholm disease and abortive acute anterior poliomyelitis. Bacterial examination of the blood, cerebrospinal fluid, fæces, and smears from the nose and pharynx have been negative in every case so far reported, and the probability seems to be that a virus is responsible. The cardinal features of the disease are as follows. It mainly affects children and young adults between 4 and 20 years, though it has been described in older people; most cases arise during the summer, and usually in epidemic form; the illness starts abruptly with severe pain, situated as a rule in the lower part of the chest and upper part of the abdomen on both

1. Weterings, P. A. A., *Ned. Tijdschr. Geneesk.* 1939, **83**, 2326.

sides, but sometimes in the back or lower abdomen, and accompanied by rise of temperature to between 100° and 102° F.; recovery from the initial attack takes place after about 24 hours, but there is usually a relapse on the third day, again lasting about 24 hours; and pathological examination is negative.

The prognosis is wholly favourable, and the chief importance of the disease lies in the readiness with which it may be mistaken for more serious conditions—for example, acute appendicitis, perforated peptic ulcer, pneumonia or pleurisy. Of Weterings's three patients one was admitted to hospital as a case of acute appendicitis, one as perforated peptic ulcer and one as diaphragmatic pleurisy. All three seemed seriously ill on admission, and the first two showed pronounced muscular rigidity. The first patient, a youth of fifteen, was operated on for supposed perforation of a peptic ulcer, and only the fact that the symptoms were very similar saved the second patient from an unnecessary operation. Bornholm disease is uncommon, but it should be thought of in the differential diagnosis of an acute abdomen.

NATIONAL CAMPS

THE Minister of Health has told the House of Commons of the progress so far made in implementing the Camps Act. The National Camps Corporation Ltd. has inspected 155 sites of which 30 have been approved for use as school-camps in time of peace and as evacuation camps in time of war; of these sites two have been given to the corporation and the others have been purchased or are shortly to be purchased. The camps are being built to the design of the consulting architects, Sir John Burnet, Tait and Lorne; the buildings will be of Canadian cedar with cedar shingle roofs. Each camp will be laid out by an architect selected from a panel approved by the Royal Institute of British Architects. Work has begun on two camps in the county of Oxford, one in Hants and one in Bucks, and seven others will be started within a few days. The first camp will be completed by the end of August.

CHEMOTHERAPY AND THE WHITE CELLS

Dr. Leonard Colebrook's letter on p. 158 should be read by all who use sulphanilamide; and they are many. It is more than three years since we published his first report, with Dr. Meave Kenny, on the effects of Prontosil in puerperal sepsis, and as a pioneer of the new chemotherapy his plea for caution demands respect from more recent adherents. He is concerned, as will be seen, with the risk of inducing with sulphanilamide and its congeners a dangerous or even fatal diminution of polymorphonuclear leucocytes. At a time when tons of these drugs are being consumed in Europe and America every month, if not every week, it may seem that this risk is remote, since very few fatal cases have been reported. But the question arises, Are they recognised? Are not the toxic symptoms usually put down to the illness for which the remedy is prescribed? Elsewhere in this issue Dr. French records a study of the blood of children given large doses of sulphanilamide over longish periods; and like Britton and Howkins, who gave smaller quantities to ambulant patients, she notes a slight but constant depression of polymorphs, which might well become serious where the bone-marrow was already depressed by infection. The bright side of chemotherapy is represented by the paper on p. 148 by Prof. Baird and his colleagues at Aberdeen, where prontosil was introduced in 1936. Their few fatal cases, however, include one, hitherto unrecorded, in which high dosage (in 1937) produced agranulocytosis; and we fear that in private practice this disaster is still not uncommon though often misinterpreted. Dr. Colebrook makes practical suggestions for its avoidance; while on another page Prof. Campbell and Dr. Morgan write encouragingly of the prevention of another and less serious complication—methæmoglobinæmia—by means of methylene-blue.

DANZIG SCHEME FOR EARLY DETECTION OF CANCER

ON June 1 a law came into force in the Free City of Danzig which enables women over 30 and men over 45 to undergo an annual examination for malignant disease free of cost to themselves. It also provides for the creation of an administrative body to combat cancer by educational activities and otherwise. The new law requires that treatment of the disease shall be in the hands of doctors only, treatment by correspondence and other irregular and unethical methods being forbidden. Early notification is imposed on the practitioner who diagnoses cancer, and the cost of diagnosis is to be borne by the administrative body in question. In a review of the considerations behind this new legislation Redenz[1] quotes instructive figures from Mecklenburg where a system of voluntary notification of all new cases of malignant disease has been started. From April, 1937, to April, 1938, in this community of some 800,000 souls, 1040 women and 823 men were notified as suffering from cancer; in other words, the annual incidence was 0·23 per cent. These cases were classified in two main groups according as the lesion was or was not accessible to palpation and inspection. In the first group there were only 226 men but 611 women, whereas in the second group there were 597 men and only 331 women. (The reason why these figures do not tot up to the score of those already mentioned is that in a few cases the exact seat of the disease was unknown.) The classification shows the relatively unfavourable situation of men as regards the frequency with which they suffer from deep-seated cancers.

Redenz, who is in charge of the State Maternity Hospital in Danzig-Langfuhr, writes as an enthusiastic supporter of the new law and hopes it will prove a model for similar legislation elsewhere.

1. Redenz, E., *Dtsch. med. Wschr.* May 26, 1939, p. 854.

V.D. TREATMENT DURING MILITARY TRAINING.—The men who are being called up as liable for service under the Military Training Act, 1939, may well include patients receiving treatment for venereal disease by private practitioners. As it is desirable that the treatment should not be interrupted information regarding each case should be available to the medical board undertaking the examination and details of previous treatment should be made known to the medical officer at the depot where the patient is called up.

The Ministry of Health does not think it practicable to circularise all practitioners, but considers it would be helpful if medical officers of health instructed those distributing arsenobenzene compounds to practitioners, and pathologists doing tests of specimens for private practitioners, to send with the supply of the compound or with the report that a specimen is positive a request that, in the event of a patient being called up under the act, the practitioner should furnish him with particulars of the case on form V.15. Copies of the form can be had from the nearest V.D. treatment centre.

SPECIAL ARTICLES

PREVENTION AND TREATMENT OF PUERPERAL SEPSIS

DUE TO HÆMOLYTIC STREPTOCOCCI

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THE incidence of puerperal sepsis due to hæmolytic streptococci depends on the presence of the organism at the time of labour, the general resistance of the patient, and to some extent the amount of trauma sustained. Although better obstetrics will lessen damage to the genital tract, and good antenatal care will do much to improve the patient's resistance, the most important single factor is probably the presence of the hæmolytic streptococcus in the genital tract at the time of delivery.

It has been shown that most of the deaths from puerperal sepsis are caused by the hæmolytic streptococcus group A, and that this organism is absent from the genital tract before labour begins. Every effort should therefore be made to keep it from entering the genital tract while labour is in progress. This can be done by asepsis and antisepsis, the use of masks, and the exclusion of carriers of streptococci from the labour-room. All these precautions should be taken in every case, so that if one barrier breaks down there will still be others. For example, while an efficient mask may prevent spread of infection for a short time, it may be a source of danger when the wearer is in attendance on the case throughout a long labour and he becomes unmindful of it.

EXCLUSION OF CARRIERS

In Aberdeen Maternity Hospital during the year 1938 stringent precautions were taken to prevent carriers of streptococci from attending patients in labour. This involved the examination of all students and pupil-nurses entering upon training and the re-examination of anyone with signs of infection in the upper respiratory tract. Where hæmolytic streptococci were found, the carrier was sent to a laryngologist, and where he discovered chronic inflammation or a history of recurrent attacks of tonsillitis, removal of the tonsils was recommended. Where the nose and throat were reported healthy and the organisms were scanty, gargling or painting with antiseptics was carried out and the student or nurse allowed to proceed with training. The following are the findings for the year 1938.

Fifteen swabs were taken from 7 members of the medical staff, of whom only 1 was shown to have hæmolytic streptococci. His tonsils were reported to be enlarged and unhealthy, and tonsillectomy was performed. No streptococci were found at a subsequent examination. A mild infection of the upper respiratory tract developed in 4 doctors, but none was due to hæmolytic streptococci.

Fifty-four swabs were taken from 49 members of the nursing staff, of whom 5 were shown to have hæmolytic streptococci. Of these, 2 had unhealthy tonsils, and the streptococcus belonged to group A. Tonsillectomy was performed, and in both cases swabs taken later did not show any streptococci. The other 3 cases showed only a few colonies of streptococci, and grouping was not done. The tonsils appeared to be healthy, and after local treatment for a few days the streptococci disappeared. The nurses were all allowed to proceed with their training. Infection of the upper respiratory tract developed in 4 members of the nursing staff: in 1 the infection was due to a hæmolytic streptococcus, but the organism disappeared after local treatment of the throat.

Eighty-two swabs were taken from 71 students, of whom 8 were shown to have hæmolytic streptococci. In 1 case the tonsils showed chronic inflammation, and local treatment did not clear up the infection. The student was then given sulphanilamide 1 tablet (0·5 gramme) three times daily for five days, after which a swab did not show the organism. In the other 7 cases the tonsils were clinically healthy, and, since the organisms were not present in large numbers, the students were allowed to go on with their training but were warned to be extremely careful in their technique.

Among 773 booked cases delivered in the hospital in 1938 there was 1 case of notifiable pyrexia due to the hæmolytic streptococcus. This woman had been in labour for eight hours before she was admitted to hospital, and none of the members of the hospital staff who were in contact with her was a carrier of hæmolytic streptococci. She did not have the organism in her throat. The temperature settled quickly under treatment. During the same year the staff attended 464 other cases, made up of 260 booked district cases, 7 emergency district cases, and 197 emergency hospital cases; 5 of them developed notifiable pyrexia due to a hæmolytic streptococcus. Although the numbers are too small for definite conclusions to be drawn, they suggest that the risk of infection with the hæmolytic streptococcus is much less when the whole labour is conducted inside the hospital. It may be objected that the two groups are not comparable, since the smaller one contains 204 emergency cases, many of which were abnormal; but against this the booked district cases are specially selected parous women, who had had previous easy labours; further, many of the booked cases delivered in the hospital were sent there early in pregnancy because of expected difficulty. Therefore the proportion of women having difficult delivery was about the same in both groups. In any case, infection with the hæmolytic streptococcus does not depend so much on the type of labour as on the risk of exposure to the organism.

In an attempt to throw more light on the problem, an analysis of all cases of puerperal pyrexia in the city and county of Aberdeen requiring hospital treatment in 1938 has been made. This has been possible because all such cases are treated in the city fever hospital. During 1938 32 cases were admitted (excluding abortions) in which the infecting organism was a hæmolytic streptococcus. The total number of births in the area, less those in the maternity hospital, was 5387. This gives an incidence of notifiable pyrexia due to hæmolytic streptococcal infection of 1 in 168 as compared with 1 in 773 in the maternity hospital. These findings agree with the figures which have been published by other hospitals recently and support the view that the risk of the patient developing a puerperal infection due to a hæmolytic streptococcus is at the moment much less in a well-run maternity hospital than it is in her home.

EFFECT OF CHEMOTHERAPY

It was thought that an analysis of the maternal deaths might reveal whether the use of sulphanilamide had caused any reduction in the death-rate. For this purpose the maternal deaths in the city and county area of Aberdeen in the last eight years have been investigated. They have been divided into two groups: 1931–35 and 1936–38 inclusive. Table I shows a reduction in the total death-rate from 6·2 to 4·6 per 1000. This is due to a large extent to a fall

TABLE I—MATERNAL DEATHS IN THE CITY AND COUNTY OF ABERDEEN, 1931–38

Year	Births	Maternal deaths	Death-rate (per 1000)	Death-rate due to sepsis (per 1000)	Deaths from sepsis	Aver. yearly deaths due to haem. strept.
1931–1935	30,172	190	6·2	2·05	61*	7·6
1936–1938	17,527	82	4·6	1·02	18†	2·66

* 38 due to hæmolytic streptococcus.
† 8 due to hæmolytic streptococcus.
The total maternal death-rate is high, owing to the fact that all deaths from intercurrent disease, such as pneumonia, heart-disease, and malignant disease in pregnant women, are included. If such deaths were excluded, the death-rate for 1936–38 would be 3·5 per 1000 instead of 4·6.

in the death-rate from sepsis. It fell from 2·05 to 1·02 per 1000. On further analysis of the cases of sepsis it is seen that the biggest fall in the death-rate is in the cases due to the hæmolytic streptococcus. There were 38 deaths from sepsis due to hæmolytic streptococci in the first five years (1·26 per 1000) and 8 deaths in the next three years (0·45 per 1000). As regards the cases of sepsis due to other organisms, there were 23 deaths in the first five years (0·76 per 1000) and 10 deaths in the next three years (0·57 per 1000)—not such a sharp fall.

While it still remains impracticable to conduct all midwifery cases in hospital, it is thought that many deaths might be prevented by the use of the sulphonamides. To ascertain to what extent the improvement in the results of treatment of puerperal sepsis is due to the administration of sulphonamides, and in which type or types of infection this has taken place, a survey of all cases admitted to the puerperal ward at the Aberdeen city fever hospital during the years 1931–38 inclusive has been made in table II.

TABLE II—CASES OF PUERPERAL SEPSIS ADMITTED TO ABERDEEN CITY FEVER HOSPITAL, 1931–38

Organism responsible for death	Group A: Jan., 1931–June, 1936			Group B: June, 1936–Dec., 1938		
	Cases	Deaths		Cases	Deaths	
Hæmolytic streptococcus	240	46 (19·2%)		96	8 (8·3%)	
Anaerobic streptococcus	313	7	31 (9·9%)	104	2	10 (9·6%)
Staphylococcus		9			4	
B. coli ..		7			1	
Miscellaneous		8			3	
Total ..	553	77 (13·9%)		200	18 (9·0%)	

This hospital admits patients with puerperal sepsis from a rather larger area than the city and county of Aberdeen, thus explaining the slight difference in figures from those in table I.

During this period 753 patients with puerperal sepsis were admitted. The patients have been divided into two groups. Group A consists of 553 patients admitted during the period January, 1931, to June, 1936, and group B consists of 200 patients admitted during the period July, 1936, to December, 1938, all of whom had sulphonamide treatment. Of the 553 patients in group A 77 died, giving a case-mortality of 13·9 per cent. Of the 200 patients in group B 18 died, giving a case-mortality of 9·0 per cent. This shows that a reduction in the total case-mortality has taken place since the introduction of sulphonamide therapy.

A further analysis shows that of the 553 cases comprising group A 240 were due to infection by hæmolytic streptococci, with 46 deaths (19·2 per cent.). Of the remaining 313 patients with infections due to other organisms 31 died (9·9 per cent.). In group B 96 out of 200 patients were infected with hæmolytic streptococci, 8 (8·3 per cent.) of whom died, and of the remaining 104 with infections due to other organisms 10 died (9·6 per cent.). Thus it is evident that, whereas the case-mortality of infections due to organisms other than the hæmolytic streptococcus shows only an insignificant difference (9·9 per cent.) in the first group as compared with 9·6 per cent. in the second), there is a fall in the case-mortality from 19·2 to 8·3 per cent. in infections with hæmolytic streptococci.

TABLE III—STREPTOCOCCAL PUERPERAL SEPSIS CLASSIFIED ACCORDING TO EASE OF DELIVERY, BEFORE AND AFTER THE INTRODUCTION OF SULPHANILAMIDE THERAPY

Year	Strepto-coccal cases	Easy deliveries		Difficult deliveries	
		Recoveries	Deaths	Recoveries	Deaths
1931	34	22	2	6	4
1932	47	27	3	10	7
1933	23	12	4	4	3
1934	51	28	7	13	3
1935	54	31	3	14	6
1936	31	17	1	12	1
Total	240	137	20 (12·7%)	59	24 (28·9%)
1936	19	8	0	9	2
1937	40	22	1	15	2
1938	37	17	1	17	2
Total	96	47	2 (4·1%)	41	6 (12·8%)

It is generally recognised that the risk of a puerperal infection increases in proportion to the amount of manipulation carried out and to the extent of the local laceration and tissue damage sustained. To ascertain the effect of local trauma on prognosis it was decided to divide the cases into two groups: (1) difficult labours, including all forceps deliveries, manual versions, craniotomies, and spontaneous deliveries where there was evidence of much tearing; and (2) easy deliveries, including spontaneous deliveries and cases in which it could be ascertained that no surgical intervention had taken place. It was assumed that the local trauma would be more severe in the first than in the second group.

Table III shows that, before the introduction of sulphonamide treatment, there were 157 cases of hæmolytic streptococcal infection following easy delivery, with 20 deaths (12·7 per cent.), and 83

following difficult delivery, with 24 deaths (28·9 per cent.). After the introduction of sulphonamide treatment there were 49 cases of hæmolytic streptococcal infection following easy delivery, with 2 deaths (4·1 per cent.), and 47 following difficult delivery, with 6 deaths (12·8 per cent.). As a result of sulphonamide treatment, therefore, a striking fall in the case-mortality of hæmolytic streptococcal infection has taken place, irrespective of the type of labour but more obvious where the labour has been easy. There has been a relative fall in the proportion of cases of puerperal sepsis due to the hæmolytic streptococcus after easy delivery admitted to hospital. This may be due to the fact that patients with sepsis after easy delivery are quickly cured with sulphanilamide and do not require hospital treatment. There has been a fall in the total number of cases admitted to the puerperal wards in the last two years. It is clear therefore that in spite of sulphonamide treatment the prognosis is poor in hæmolytic streptococcal infection when there has been extensive local trauma.

CASE-RECORDS

It was thought worth while to summarise the case-histories of the eight fatal cases in the hæmolytic streptococcal group, treated with sulphonamide, and to ascertain what were the chief factors responsible for the deaths.

CASE 1.—A primipara, aged 26, admitted to hospital in 1936 on the fifth day of her puerperium. There was a history of a difficult forceps delivery, a stillborn child, and a large postpartum hæmorrhage. She had a rigor on the second day of the puerperium. On admission she was very ill, with signs of a pelvic peritonitis. She was also suffering from a secondary anæmia: red blood-cells 1,530,000, hæmoglobin 27 per cent. Examination revealed a severe degree of perineal and vaginal tearing.

The patient was *treated* with Prontosil rubrum (10 c.cm. of a 2½ per cent. solution intramuscularly eight-hourly) and Prontosil album (sulphanilamide) 1 g. eight-hourly. Despite treatment she developed a phlegmasia alba dolens on the ninth day of her puerperium and a streptococcal empyema on the fourteenth day. She died the following day. Blood-culture was positive to hæmolytic streptococci. At no time during the course of the illness did the patient respond to treatment. No sulphanilamide was administered before admission to hospital.

In this case the factors responsible for the fatal issue were severe trauma with postpartum hæmorrhage, delay in instituting chemotherapy, and possibly inadequate dosage.

CASE 2.—A 6-para, aged 27, admitted to hospital in October, 1936, with a history of a very difficult labour: transverse lie, attempted internal version, decapitation, and manual removal of placenta. She developed a rise of temperature on the third day. She was admitted to hospital the following day and had a rigor the same evening. She had no sulphanilamide before admission.

Treatment.—10 c.cm. of a 2½ per cent. solution of prontosil rubrum intramuscularly eight-hourly, and sulphanilamide (1 g.) eight-hourly. She died of a typical septicæmia without localising signs on the tenth day of her puerperium.

The important factor in this case was probably poor antenatal and intranatal care, resulting in unnecessary trauma and massive invasion of the tissues.

CASE 3.—A 10-para, aged 40, had had a septic abortion when she was four months pregnant, and was admitted in 1937 on the seventh day of the puerperium. She had been previously in poor general health, and had a spontaneous abortion after bleeding five days. No medical man was consulted. She had had several rigors before assistance was sought. On admission she was very ill and suffering from a septicæmia. Three hours after admission an embolus entered her left retinal artery, and within seventy-two hours the eyeball ruptured and the lens was extruded.

Treatment.—Prontosil rubrum 10 c.cm. of a 2½ per cent. solution intramuscularly twelve-hourly and sulphanilamide 3 tablets eight-hourly. She died on the fourth day in hospital.

In this case there were three factors: no antenatal care; delay in sending for medical aid; and delay in instituting chemotherapy.

CASE 4.—A primipara, aged 34, admitted in 1937 on the sixth day of her puerperium. She had had her membranes artificially ruptured. She was delivered by forceps, having been in labour only three hours. There were numerous rigors before admission to hospital.

Treatment.—Sulphanilamide 1½ g. four-hourly by mouth and 10 c.cm. of prontosil rubrum intramuscularly eight-hourly. Despite intensive treatment she showed no response and died of a pneumonia seven days after admission.

In this case there was unnecessary trauma due to too early application of forceps and delay in instituting chemotherapy.

CASE 5.—An 11-para, aged 41, admitted to the maternity hospital in 1937 with a history of a central placenta prævia and much hæmorrhage. Bipolar version was performed. The child was stillborn. The patient developed a rise of temperature on the third day and was admitted to the City Fever Hospital six days later.

Treatment.—On admission she was given sulphanilamide (1 g.) by mouth eight-hourly. Streptococci were demonstrated in the blood-stream on the sixteenth day of her puerperium. The dose of sulphanilamide was increased to 1½ g. four-hourly, and prontosil rubrum 10 c.cm. was administered intramuscularly eight-hourly. By the thirtieth day her blood-culture was sterile, and sulphonamide was discontinued. On the thirty-fifth day she was discovered to have a complete agranulocytosis, and despite three blood-transfusions she died on the thirty-seventh day.

In this case death was due to faulty treatment of the placenta prævia and to overdosage of sulphonamides.

CASE 6.—An 8-para, aged 28, admitted to hospital in 1938 with a history of having been eight hours in labour with a breech delivery. The child was born before assistance was obtained. The patient had a rigor on the first day of her puerperium and was admitted on the second day, when she was found to have a septicæmia.

The *treatment* adopted was sulphanilamide 1 g. by mouth four-hourly. No improvement was observed by the twelfth day, when in addition to oral prontosil she was given prontosil rubrum (10 c.cm. of a 5 per cent. solution) intramuscularly eight-hourly. On the eighteenth day she developed a phlegmasia. The administration of sulphonamides was continued until the thirty-fourth day without the slightest response. She died on the forty-second day, there being evidence of numerous pulmonary infarcts at necropsy.

There is nothing here to account for the failure of chemotherapy.

CASE 7.—A primipara, aged 20, admitted to hospital in 1938. Labour lasted eighteen hours, and she was delivered by forceps of a live child. The patient was being looked after by a midwife. She developed a pyrexia on the first day of her puerperium but was not admitted to hospital until the seventh day. No treatment had been given.

Treatment.—Sulphanilamide 1 g. eight-hourly was administered until the fifteenth day, when a small piece of placental tissue was removed. Her blood-culture was positive the following day, when the dosage was increased to sulphanilamide 1 g. by mouth four-hourly and 10 c.cm. of a 5 per cent. solution of prontosil rubrum eight-hourly. The same day she was given a transfusion of one pint of blood. Despite intensive treatment carried on for a further twenty-six days, she developed a septic streptococcal arthritis of both wrist-joints and one knee-joint. She died of exhaustion on the sixty-third day of her puerperium.

In this case a piece of placental tissue was left inside the uterus, and sulphanilamide treatment was not begun until the seventh day post partum.

CASE 8.—A 10-para, aged 40, admitted to hospital in 1938. She was in very poor health during her pregnancy. She was a midwife's case, but the delivery had to be assisted by a low-forceps operation after she had been seven hours in labour. She had a rigor on the second day of the puerperium, but the doctor was not recalled until the seventh day, when she was admitted to hospital. No sulphanilamide was administered before admission.

Treatment.—She was given sulphanilamide 1 g. by mouth four-hourly. On the tenth day she was also given 10 c.cm. of a 5 per cent. solution of prontosil rubrum intramuscularly eight-hourly. By the fifteenth day her blood-culture was sterile and her temperature and pulse-rate had almost settled. On the seventeenth day, however, the temperature again rose and her blood-culture again became positive. M. & B. 693 1 g. four-hourly was substituted for the prontosil on the twenty-second day without success, and she died on the thirty-fourth day of her puerperium.

In this case there was unjustifiable delay in sending the patient to hospital and instituting chemotherapy.

COMMENTS

On consideration of the above case-histories we think that it would be fair to conclude that antenatal care was deficient in cases 2, 3, and 8. Better supervision during pregnancy might have prevented the malpresentation in case 2 and thus have avoided the subsequent manipulations. Case 3 did not consult a doctor during her pregnancy, and her condition must be considered to be unavoidable, illustrating the need for increasing educational facilities and for emphasising the dangers of abortion in unfavourable circumstances. In case 8 supervision during the antenatal period would possibly have led to improvement in her general condition and thus have increased her resistance to infection.

Better facilities during labour in cases 1, 4, 5, and 6 might have prevented infection. In case 1 the severe perineal and vaginal lacerations in conjunction with postpartum hæmorrhage predisposed to infection. Case 4 had obviously been mismanaged, forceps having been applied in a primigravida only three hours in labour. In case 5 cæsarean section might have been considered, but this depended on the amount of interference before admission to the maternity unit and on other factors. Case 6 illustrates the necessity for a qualified person to be present at every labour to avert the danger of the woman either infecting herself or being infected by the unskilled attentions of a neighbour.

Better supervision during the puerperium might have led to earlier hospitalisation in cases 1, 3, 4, 7, and 8. We think that all will agree that there was obvious delay between the first signs of fever and admission to hospital. Experience shows that the longer the appropriate measures are delayed, and the more advanced are the pathological changes, the less chance have specific measures of effecting a cure.

As regards treatment after admission to the puerperal ward at the City Hospital, Aberdeen, it might be suggested that in cases 1 and 2 the dose of sulphanilamide was too small. However, at that time sulphanilamide treatment was in its very early stages, and an attempt was being made to assess the optimal dosage. A fatal issue in case 3 was unavoidable with any form of treatment. Despite adequate doses of sulphanilamide in cases 4, 6, 7, and 8, the drug did not control the infection. Circumstances were particularly favourable in case 6, although the patient was suffering from septicæmia, for she was admitted on the second day of her puerperium and appropriate treatment was instituted early. In cases 4, 7, and 8 circumstances were not quite so favourable, fever having begun several days before admission. It is more than possible that types of hæmolytic streptococci vary in their susceptibility to the drug. Case 5 was rather an unfortunate one, the infection having been controlled, but the patient dying of an agranulocytosis following relatively heavy dosage of sulphonamides.

CONCLUSIONS

In a well-run maternity unit, where strict control of all contacts during labour and the puerperium is obtainable, the incidence of streptococcal sepsis can be reduced to a very low level.

During the past three years the death-rate due to puerperal sepsis has been much reduced, particularly in patients infected with hæmolytic streptococci. The improvement is mainly due to treatment with sulphonamides.

The chief factors predisposing to failure with sulphonamide treatment are closely related to the extent of trauma, the late institution of adequate and appropriate therapy, and the degree of advancement of the pathological changes when first seen.

SUMMARY

(1) The incidence of puerperal sepsis due to hæmolytic streptococci depends on the presence of the organism in the genital tract during labour, the patient's resistance, and the amount of trauma sustained.

(2) Most of the deaths from such sepsis are caused by the hæmolytic streptococcus group A, absent from the genital tract before labour.

(3) The access of the organism to the genital tract during labour can be prevented by asepsis, antisepsis, the use of masks, and the exclusion of carriers of streptococci from the labour-room.

(4) The risk of infection with the hæmolytic streptococcus is much less when the whole labour is conducted in hospital.

(5) The maternal deaths in Aberdeen are analysed in two periods—1931–35 and 1936–38. There was a fall in the death-rate from 6·2 to 4·6 per thousand, due mainly to a fall (from 2·05 to 1·02 per thousand) in the death-rate from sepsis, the biggest fall in cases of sepsis being in those due to the hæmolytic streptococcus.

(6) An analysis of the cases of puerperal sepsis in Aberdeen in two periods—before and after the introduction of sulphonamide therapy—shows a fall in the total case-mortality from 13·9 to 9·0 per cent., and a fall from 19·2 to 8·3 per cent. in the case-mortality of sepsis due to the hæmolytic streptococcus.

(7) To decide the effect of trauma on the incidence of puerperal sepsis, cases were analysed in two

groups according to whether delivery was easy or not. It was found that with easy delivery the case-mortality was 12·7 per cent. and with difficult delivery 28·9 per cent. before the introduction of sulphanilamide, and 4·1 per cent. with easy delivery and 12·8 per cent. with difficult delivery after the introduction of sulphanilamide therapy. Therefore, in spite of treatment with sulphanilamide, the prognosis is poor in hæmolytic streptococcal infection in the presence of extensive local trauma.

(8) Eight fatal cases are summarised, and the chief factors responsible for death are pointed out.

WAR NEUROSES

THE EX-SERVICES WELFARE SOCIETY held its annual medical conference on July 7, with the president, Prof. EDWARD MAPOTHER, in the chair. The subject of discussion was the incidence of war neuroses in civilians and in each of the armed forces. The chairman, in opening, asked for practical suggestions for the prevention of neuroses, and for answers to basic questions: What can be done to reduce mental stress? How far can individual predisposition be detected and the susceptible put to forms of service in which they can be useful? How can the causal factor of personal advantage be prevented by raising morale and by taking profit out of the neuroses? A new problem in a future war may, he said, be an increase of neurosis among civilians. There is no evidence that any neurosis was caused by air-raids in the last war; on the other hand, future air-raids may be far more trying. Much will depend on the efficiency with which our own aircraft repel raiders. Defending gunfire is nearly as productive of neurosis as enemy bombs.

SERVICE VIEWS AND EXPERIENCE

Surgeon Vice-Admiral P. T. NICHOLLS said that according to data given by Beaton admissions at Chatham for neurosis and psychosis rose steadily through the late war relatively to the numbers of the personnel. Forty-one per cent. were classed as psychoses, but the proportion today would perhaps be smaller. Of the three neurotic groups—neurasthenia, hysteria and shell-shock, the first was by far the largest and 95 per cent. of the cases in it were suffering from anxiety states. Many anxiety cases closely resembled cases of Graves's disease. Hysteria was much rarer than in the Army, perhaps because sailors as a class are more independent and less suggestible than soldiers. Most neurotics were lost to the service. In a future war the problem might be made more severe by insecurity from air-raids in harbour and by anxiety for the safety of wives and families. The figures would be increased by flying stress neurosis in the Fleet Air Arm. Steps should be taken to eliminate men with a constitutional tendency to neurosis, but it is not practicable to examine all troops psychiatrically or to attempt to restore neurotic patients to duty by psychotherapy. Every effort should be made to send psychiatric casualties quickly to a centre where expert diagnosis is available, and then to dispose of them suitably. This plan may present great difficulty among sailors serving in remote parts of the world. There is a serious shortage of medical officers capable of performing this service.

Major-General ROBERT PRIEST said that the Army has already begun to apply many of the points suggested by Prof. Mira on the basis of his Spanish experience. All officers receive lectures on mental disorder and impart their knowledge to the troops. The question of selecting personnel and deciding, on the history of each man, whether he shall be employed in front or back areas is still under discussion. If the officers are prepared by special notice, it is practicable to discharge patients before they are completely cured. The incidence of nervous disorder would be much reduced by keeping up the strength of the forces and of the population by good and regular feeding. Preliminary training—for example, by black-outs—should be applied energetically to the civilian population to eliminate the all-important element of surprise.

Group-Captain H. L. BURTON gave figures for the incidence of nervous disorder in the Royal Air Force in 1937: in a total force of 60,000 the admissions for psychoneurosis were 125, of whom 41 were invalided—an incidence of 2·1 per thousand. There were 24 cases of mental disease. Mental and nervous illness is the commonest cause of invaliding in the Royal Air Force, perhaps because the standard of criticism is so high. Flying personnel are weeded out early in their training, and the incidence among fully trained flying staff is low. Neurosis is not closely connected with the duties of a patient, but rather with conflict. Most patients show a marked lack of confidence, but often the only prominent symptom is a general failure to perform duties efficiently. Among men classed as unlikely to make good fliers, temperamental defects account for 80 per cent. These may be combined with psychomotor defects and are usually detected early. A second group realise that they cannot cope with the faster machines they meet in later training. A third group, breaking down after a career of some length, do so from unexplained loss of confidence, from a definite event such as an accident, or from private trouble. Some develop a growing feeling that it is only a matter of time before disaster overtakes them. The precise classification of nervous disorder is not regarded as important, for most men who break down are lost to the service. Breakdowns among the lower ranks from psychological inferiority have increased. It is difficult to decide whom to discharge, for it is bad to discharge too freely. Some method of eliminating unsuitable recruits is needed.

Among the flying personnel the watchword is prophylaxis. All medical officers receive a brief course in psychology applied to their particular work. They observe their personnel constantly for signs of stress and suggest modifications of the work where necessary. They encourage men to discuss their troubles, and offer advice. Very little intensive psychotherapy is performed: few medical officers can give it, and there is no conviction of its value. In war-time the scheme of treatment would consist of a series of filters. The first is the medical officer of the unit; the second is the consultant, to whom doubtful cases would be sent. Treatment would be short and mild: men would either go straight back to duty after a rest and explanation, or be given a short period of leave, or be sent to a special hospital for psychotherapy. Prognosis would depend on the extent to which the patient had acquired control of his emotional level by his intellect or sentiments. Men should not be invalided back to civilian life, but retained in uniform and subject to duty unless they were quite hopeless and incompetent.

Dr. E. PRIDEAUX said that during the war about 30 per cent. of those who broke down mentally were constitutional neuropaths. These were mostly

persons who had been in some kind of clerical occupation and had been conscripted; their physique was inferior and they broke down at home. Hysterics broke down after a short period of service overseas; anxiety patients after perhaps a year and a half. Of the psychological inferiors, who would probably today be called high-grade feeble-minded, nearly all went overseas and a third of them served through the whole war, mostly in departmental units but quite usefully.

Prof. EMILIO MIRA (chief psychiatric inspector to the Spanish Republican Army) distinguished three periods in the Spanish war. During the first period service was voluntary and the element of conflict was absent. There were no figures, but the incidence of nervous troubles was probably low. In the second period the army was organised and there was a high casualty-rate. The incidence of discharge for war neurosis was 1·5 per thousand. Soldiers from the North of Spain resisted neurosis better but suffered from it worse. The incidence among front-line troops was strikingly low, probably because their morale was better. Its most common form was conversion hysteria, which often yielded to a few days' treatment. Anxiety states were common, but usually developed into hysterical syndromes. The third period was marked by shortage of food, the conscription of very young troops, and lack of confidence in victory. There was no great increase in neurosis, as the psychological selection was good and front-line troops were not psychiatrically infected. The highest incidence was among anti-aircraft units and sanitary services; the second among infantry and transport. Symptoms among flying officers were due rather to exhaustion than to neurosis. Nervous breakdown was very rare in the 10th and the 15th Corps, which consisted of Communists with strong political sympathies. The source of neurosis being fear, a strong enthusiasm will counteract it. Prof. Mira considered that the best antidote to war neurosis is a campaign of political information to inspire devotion to the object for which the war is being fought. This is particularly necessary in country districts. There was no great increase in neurosis among civilians under totalitarian conditions. As soon as social order and organisation were established, the frequency of nervous and mental disorder fell to the normal peace-time level.

Dr. E. GUTTMANN said that as far as he could judge from the scanty German statistics available, acute neurotic reactions in front-line troops of the German army in the late war were rare. The incidence in the navy was about half that in the army, and the proportion of neurosis to psychosis was as ten to seven. Air-raids on civilians did not appear to cause any increase in admissions to psychiatric clinics; an increase of anxiety was, however, noticed among inpatients. He gave some statistics from earthquake districts.

PROPAGANDA AND DISCIPLINE

Dr. A. MCGLASHAN said that the two main psychological effects of war-flying on a pilot are to cause extravagance of behaviour and lability of the emotional state. A pilot during an expedition is intensely suggestible, for he is very young, he is alone and unsupervised, and his only task is to discharge his bombs. It is difficult to be heroic about dropping bombs on women and children, and pilots have an instinctive distaste for the work. Psychological ingenuity could be used to take advantage of the mental vulnerability of the pilot and induce panic in him. His suggestibility should be intensified by propaganda and worked upon by suitable methods during air-raids. A committee of psychologists could probably devise effective methods.

Dr. THOMAS BEATON said that an unusual number of patients attended his outpatient clinic in Portsmouth last September. The number may rise in a war through the effect of general tension on existing nervous instability. High emotional tension did not produce neurosis or psychosis in any of the casualties of the Zeebrugge raid, and will only produce mental disturbance in predisposed persons. Anxiety neurosis in the Navy was really due to exhaustion as the end-result of protracted stress, and very few cases could be restored to duty. A large proportion showed a definite enlargement of the thyroid. A high proportion of psychotics were cured. Neurotics must have security but not comfort: good discipline is essential, and success would largely depend on the popular attitude to the neurotic being sound. He must not be pampered: the term "shell-shock" was one of the most important causes of the condition in the last war. Dr. Beaton said he was a little frightened of the responsibility which courts, schools, administrators and now the fighting services tend to throw on the psychiatrist, who is only a human being. He can pick out a definite psychotic but cannot really claim to assess the possibilities of neurosis in a soldier or sailor.

Dr. IVOR DAVIES pointed to the very high incidence of minor neurosis in the population today. Half the outpatient cases in the Cardiff Royal Infirmary are functional, and these do not receive treatment. Many of them are cases of gastric neurosis. The country should deal with them in peace-time, for in a war many of them would become ineffective. Hyperpietics are potential psychopaths. Thyrotoxics would be very largely incapacitated in a war. There is already a high incidence of goitre, which would be likely to become toxic under continuous threat of bombing. Allergic patients and sufferers from chronic bronchial catarrh easily develop neurosis. The schools should devote more attention to teaching children self-control and self-reliance—lessons they do not always learn at home. A.R.P. shelters should contain some persons with a knowledge of psychology, to deal immediately with neurotics. They could be selected from health visitors, social workers, sanitary inspectors, clergy, or voluntary aid detachments.

Dr. W. M. MCALISTER thought that the prospect of nervous disorder in a war is not as bad as some people fear. Panic due to air-raids does not necessarily cause a rise in mental disorders. The public must be educated to prepare them for the situations which may arise.

Dr. C. S. MYERS, F.R.S., recalled that in the last war the incidence of neurosis in badly disciplined regiments was high, in well-disciplined regiments very low. The incidence might be reduced by training fighters in a proper attitude to the enemy. Education should be framed with the object of counteracting the air pilot's objection to bombing women and children. Save for a few exceptions, no pension should be allowed for psychoneurotic disability. The vocational psychologist could probably apply his special experience to the problem of selection, and should take part in training psychiatrists.

Dr. J. D. SIMPSON said that most of the would-be flying officers who break down early are of the sub-intellectual type. Hyperthyroidal patients are unlikely to make good patients. When once a medical officer has been called in and the suggestion

of nervous disorder has been made, energetic action must be continued until cure or definite disposal.

DR. M. W. BULMAN remarked that, if Joan Grant's novel "Winged Pharaoh" could be believed, the Egyptians knew methods of psychologically disabling their enemies seven thousand years ago. The small incidence of neurosis in the Navy may have been due to the fact that the stress was intermittent and the personnel were picked regular volunteers who were accustomed to the work and were not contaminated by conscripts. Conscripted men should have an opportunity to choose their units, for unconditional compulsion is a cause of neurosis. Similarly, civilians should be allowed to choose whether they will be evacuated or not.

DR. HENRY YELLOWLEES thought that the sailor was spared much anxiety by the comforting reflection that if he were killed it would be in company with many others. The soldier had to face being picked out from among his comrades. Education in the possibility of war neurosis might do as much harm as sex education has done, and might train young people to expect a psychological disaster. The objection to the use of vocational psychology is, he considered, that war is not a vocation, and even the vocational psychologist could not turn the psychological energy of the whole country into channels which no-one would choose if he could help it.

DR. GEORGE GORDON deprecated a defeatist attitude towards the possibility of selecting personnel. Much can be done, he said, by using the enormous data on invalidism which already exists, and by testing for such reactions as dermatography and such signs as hyperthyroidism and disturbances of the autonomic system.

PROF. MAPOTHER, in closing the discussion, said that it would be impracticable to deny compensation to psychoneurotics, but it should be refused during a war, and they should not be discharged.

MENTAL HOSPITALS ASSOCIATION

THE annual meeting of this association was opened by the LORD MAYOR OF LONDON at the Guildhall on July 6. Mr. J. W. BLACK, J.P. (Leicester and Rutland), took the chair.

Divorce for Insanity

SIR LAURENCE BROCK, chairman of the Board of Control, in an address to the meeting said that visiting committees and mental-hospital officers are disturbed by the uncertainty of the legal position of a patient under the Matrimonial Causes Act, 1937. A patient may be divorced if he is incurably of unsound mind and has been continuously under care and treatment for at least five years immediately preceding the presentation of the petition. A person is under care and treatment while he is detained in pursuance of any order or inquisition under the Lunacy and Mental Treatment Acts. In the case of Shipman *v.* Shipman (1938), said Sir Laurence, it was not seriously argued that the patient was likely to recover, but she had been sent from time to time to a relative, sometimes for periods running into months, and she had spent just under 400 days outside the hospital during the statutory five years. Moreover, the visiting committee had invented a new and wholly extrastatutory form by which they had allowed her to leave the hospital on "provisional discharge." The substance of the judgment in this case appears to be that short absences, such as week-end leave, may be disregarded, but there must come a point at which absence on trial will break the continuity of the five years and do away with the right to divorce.

In certain cases the medical officer may be put in an embarrassing position, but the scope of the Shipman judgment has been somewhat narrowed by the observations of the president of the Divorce Court in Green *v.* Green (1939). In that case the patient had been sent to a home maintained by the Mental After Care Association: as he had been under some kind of control the court held that the continuity of the five-year period had not been broken. The president regarded as important the fact that the home was exclusively occupied by London County Council patients and the association were acting as agents for the council. The position of a patient who is sent to an ordinary holiday home admitting patients from different hospitals is still extremely obscure. The Board of Control have issued a circular (No. 861) on the Shipman judgment. The duty of the superintendent of a public mental hospital is clear: he must be guided solely by the interests of the patient and owes no duty to the other party to the marriage. While it would be unwise to do anything which might obstruct divorce proceedings, he ought not to be deterred from doing his best for the patient by any considerations of possible ulterior consequences to other people. The medical officer in charge of a licensed house, though no less anxious to do his best for the patient, may find his work undone by the petitioner exercising his or her right to withdraw the patient when the doctor asks consent to give leave of absence on trial. Sir Laurence hoped that the legal obscurities of this question may be cleared up before long. He expressed the personal opinion that some amendment of this part of the 1937 act will have to be made on one of two lines: either the right to divorce must be made to depend on a certain period of continuous treatment, or the act must be brought into line with the Scottish act and contain a presumption that the patient is incurable after a certain period of continuous treatment unless evidence to the contrary is produced. In any case, absence on holiday or on trial ought not to be held to break the continuity of the five-year period.

DR. T. C. GRAVES' (Birmingham), in opening a discussion on the Matrimonial Causes Act, 1937, in relation to mental-hospital practice, pointed out that a period spent as a temporary patient may not count in the five years' detention period, for the temporary recommendation may not be an "order" under the act. If it is legally an order, the original purpose of creating it is defeated. The act turns mental hospitals into places where not only a patient may be "detained" but where he may lose his life partner and perhaps his only legal friend within a few years. The stigma of the mental hospital is undoubtedly increased, and the act may induce relatives to apply for discharge before a patient is well enough. Visiting committees should see the patients who may be respondents to a divorce petition, and review the circumstances of their illness and detention. This review is of great support to the medical officer who has to give evidence. The distinction between voluntary and temporary patients on the one hand and certified patients on the other, Dr. Graves maintained, is wholly arbitrary, has no medical basis, and under the new act is grossly unfair. The Mental Treatment Act, 1930, should

be amended so that all patients except really voluntary admissions come into mental hospitals on a temporary recommendation, with a maximum of two years for treatment according to the knowledge and capacity of modern medicine and surgery and without the present obstacles to temporary treatment. The need for further residence after the initial term should be decided by the Board of Control.

Many general paralytics live on for years after modern treatment. How, asked Dr. Graves, is such a patient to be protected against divorce by the partner who gave the patient syphilis perhaps twenty years before, and what evidence will be accepted that the petitioner is responsible for the patient's condition? A petitioner may also have been guilty of "such wilful neglect or misconduct as to have conduced to the unsoundness of mind" by neglecting the patient, interfering with treatment or preventing others from helping or treating the patient. It may be advisable for the medical practitioner, before pronouncing on incurability, to state the treatment which has been given but has been unsuccessful. In a grimly defended suit the practitioner might be subjected to a severe cross-examination with the object of proving that the petitioner has wilfully put the patient in charge of someone who has neglected to take active measures to benefit him.

When a decree of divorce has been pronounced, the doctor should not give up attempting cure; he should completely forget the legal interruption and maintain an active interest in the patient's well-being and possible recovery. Many patients recover after five years. New agents and modes of treatment may be applied to mental disease with quite unexpected results. After decree *nisi* steps may be commenced to obtain an order for the maintenance of the patient and children. The guardian *ad litem*, usually the Official Solicitor, represents the patient and, if the patient recovers after divorce, will arrange to restore his/her property and rights of access to children and, where they exist, the rights to maintenance.

Dr. J. I. RUSSELL (York) said that the president of the Divorce Court, in an unreported case Crawford *v.* Crawford, said he would be favourable to the suggestion that temporary treatment if extended by the Board of Control is detention under an order. It happened, however, that by adjourning the case till the next session the five-year period could be completed without invoking the period of temporary treatment; this course was followed, and it became unnecessary for the president to decide the point.

The meeting referred the whole question of the amendment of the law to the executive committee for action, in coöperation with the visiting committees of the country.

Present Situation of Mental Hospitals

In the course of his address Sir LAURENCE BROCK said that the general position in mental hospitals shows a slight but welcome improvement since last July. The aggregate shortage of beds has been reduced from 3608 to just under 3000, but the position remains serious. Progress at Lathom Park and Margaretting has been slow, and the proposed site of the third mental hospital has had to be abandoned owing to difficulty of drainage. The position must therefore become worse in the next two or three years. Steady progress, however, continues to be made in the provision of admission units and nurses' homes. Even when the discharge-rate is unaffected, the relapse-rate falls when an early-treatment centre is opened. An indirect but important advantage is the stimulating effect of the existence of modern treatment facilities on the keenness of the medical staff. A keen doctor will not remain in hospital, or if he does remain he will not retain his keenness, unless he is given a fair chance of doing his best for his patients and if he knows that his new admissions have to be brought into overcrowded wards in contact with chronic and seriously ill patients.

English hospitals are very understaffed, he continued, in comparison with most of the continental hospitals. In the university clinic at Waldau, just outside Berne, with somewhat less than a thousand beds, the medical staff consists of a director and nine other whole-time doctors. Visiting committees do not always appreciate the hard work thrown upon the medical staff by an outpatient clinic. Medical staffs badly need strengthening, to enable the outpatient clinics to hold far more frequent sessions and do much more in the way of treatment. Such an increase would do much to remove the reproach that many outpatient centres do very little more than diagnosis. It would also reduce considerably the number of patients who have to go to mental hospitals.

Dealing with air-raid precautions, Sir Laurence said that in most hospitals it would not be practicable to attempt any considerable transfer of patients from one part of the building to another in the short time which would elapse between the warning and the raid; it would certainly not be practicable to attempt to transfer patients to trenches. The Government will not relieve local authorities of any of the expenses of maintaining institutions; the cost of emergency precautions must fall on local funds. The local authority has no more claim to relief than the employer of labour. In conclusion, he said that the national emergency must not lead to any sagging-down in mental-health services. Visiting committees should survey the field as a whole and frame a comprehensive programme, aiming wherever possible at prevention. At the moment nothing is more important than the development of outpatient centres. It will not add to the strength of national defence to neglect the mental health of the nation.

MEDICINE AND THE LAW

A Miscarriage

AT a Chester inquest last week two doctors were criticised for failure to coöperate with the Flintshire county council's scheme for welfare in maternity cases. The deceased, a married woman aged 38, had died in an ambulance on the way to hospital. The two doctors had been attending her after a miscarriage. They had omitted either to call in a specialist or to send the patient to hospital promptly. Dr. W. H. Grace, pathologist, who conducted a post-mortem examination, stated in the witness-box his opinion that the omission of the measures which the county council's scheme contemplated was responsible for the condition finally resulting in the patient's death. In the coroner's view the evidence indicated the importance of coöperating in the local authority's scheme; this was a case which should have been tackled and finished at the earliest moment. The jury added to their verdict of "death by misadventure" a rider that death was due to negligence not amounting to criminal negligence.

One of the two doctors in charge of the patient

had been in medical practice for forty-six years and had then retired. He was acting as locum tenens for the second doctor from June 2 to 9, the critical week in the patient's illness. The second doctor, having been informed by his colleague that the patient's condition was comfortable, did not visit her on the 10th, as he was not sent for. He saw her on Sunday, June 11, and on other days in that week. On the 17th he was called as the patient was worse. He then decided that she must go to hospital and he communicated with the county medical officer and made the necessary arrangements. Both doctors contended that it was not the usual practice either to send such cases to hospital within twenty-four hours or to call in a specialist. "This was an accidental case," said one of them, "a case in a hundred." "We cannot," said the other, "have a specialist on every abortion." While both of them were aware of the county council's scheme and were in sympathy with the greater attention now being paid by local authorities to welfare in maternity cases, they seemed inclined to dispute the value of the medical opinions on which these schemes are founded. Dr. Grace, on the other hand, was clear that there was a recognised medical practice in these cases, and the coroner (who evidently accepted his view) remarked that the attitude of the two doctors would frustrate the whole scheme.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A WOMAN PUBLIC-HEALTH OFFICER

III

IT would be interesting to know how many members of our profession bothered to read the exhaustive report on West Indian conditions prepared by the British Medical Association for the recent peripatetic commission. Probably not many, though it was a remarkable document, and the subject is one of grave concern to all of us, now that the relations of Britain to her colonies are an international question. The story is not a pretty one. Curable diseases not cured, preventable diseases not prevented, ancient plagues on the increase, malnutrition rife in a land of natural plenty, housing that would be intolerable for savages; and all this in an Empire of which we are justly proud. Judging from the report and other evidence offered to the commission conditions on the whole seem to be worse than when I toured the islands with a medical colleague nearly twenty years ago. Now, these West Indian islands are as lovely as a dream—lovely as film stars and as diverse in their types of beauty, in race, in religion and in their personal relationships. One might add that they are as sensitive to rivalry; the European enthusiast who always begins by advocating wide schemes of amalgamation has his troubles ahead of him.

* * *

We were fortunate in that the deficiencies of post-war transport marooned us for three weeks in the Panama Canal zone; we were thus enabled to measure West Indian conditions against the standard of the finest hygienic administration in the world. It was amusing to find that the Canal Zone is the doctor's paradise, and the older American officials who had seen the enterprise through from the beginning were quite clear as to the reason. "It was really the doctors who built the canal. The French engineers were as good as ours if not better, but they hadn't a chance. That bit of the old De Lesseps Canal over there cost a life for every yard. Then Dr. Gorgas came along and cleared out the Yellow Jack and malaria, and taught the labourers from the West Indies ('British objects' they call themselves) how to keep alive. Gorgas showed them how to eat so as to increase their work-output, and the canal got built. So do we listen to the doctor's say-so? Yes, Ma'am."

Still, it was a shock to learn, for example, that no-one is allowed to remain ill in bed in his own house for more than two days. On the third day the doctor must report the case and the patient is wafted away by ambulance-train to one of the magnificent hospitals at either end of the Zone. No bush or tree grows in the Zone except by permission of the medical officer of health. He is also empowered to inflict and collect fines for breaches of the sanitary regulations and even the local mayor can be fined up to 50 dollars if he gives trouble. I tell you, it would warm the cockles of a "sair hadden doon" medical officer's heart to watch the sort of police-court held every morning in the public-health department, with the M.O.H. acting as magistrate and sanitary inspectors collecting the fines on the spot. Even the ice-cream supply had been taken over by the health department and it was issued daily as a government ration. (Socialists may care to note for propaganda purposes that it was the best ice-cream encountered in three continents.)

Walking through the completely fly-less market at Panama with the health officer one came on a banana-skin lying in the central aisle. Can you imagine what would happen if one of H. M. Bateman's admirals found a banana-skin desecrating his quarter-deck? The ensuing scene was just like that. . . .

A few weeks later I was escorted through the market of a large West Indian capital town by another health officer; one's feet slithered in the decaying refuse, flies swarmed everywhere. "Now would you like to see where the flies come from?" asked the M.O.H. cheerily. We drove out to a huge dump a mile or so outside the town where flies and rats swarmed like the plagues of Egypt. The town council were going to do something about it next year—I believe it is there still. In another colony we visited a great sugar plantation. Stables for mules, with masses of flies breeding in the neglected yard, could be seen on one side of the manager's house; on the other was a hospital for East Indian immigrants with many cases of enteric in its unscreened wards. Oddly enough the manager himself lay dying of enteric.

We had been sent out especially to investigate the problem of venereal disease, but serious as that was it seemed to us one of the least of the West Indies' troubles. The deficiencies in environmental hygiene, the vast amount of preventable disease such as hookworm, yaws, tuberculosis and (in some islands) malaria, and the huge infantile mortality, seemed much more important. Hookworm is a particu-

larly obnoxious scourge to a country. One cannot tell what the potentialities of a population really are till it is eliminated. I saw in one of the smaller isles a village inhabited by "red-shanks," the white descendants of Cromwell's political deportees. They were a gentle listless people, with pale blue eyes and skins like badly tanned leather, and it was very tempting to dogmatise about "degenerate stock." But one was told that when cleared of hookworm they become unrecognisable—vigorous and alert in a few months. Alas, the medical officers of the Rockefeller anti-hookworm campaign have apparently had to leave the islands in despair from lack of coöperation. They had told us that the task though difficult was in no way impossible if proper help had been forthcoming.

* * *

Leprosy is an affliction so tragic that greater efforts should surely be made to eradicate it. Many of the lepers are infected very young and have an appalling life of boredom while waiting for a dreadful end. We visited every leper colony in the islands and some of them had not had a visitor for years; the courage and devotion of the officers who were working in loneliness to mitigate their charges' hopeless lot were beyond praise. In another colony years later I found that the governor's wife had broken down an ancient taboo, had brought in a committee of ladies to organise games and cinema shows and occupations for the lepers. This seems the only way to remove prejudice and to terminate the practice of concealment which is fostering this disease.

* * *

One has been hearing a great deal—though not too much—about the housing of the native worker. This is a welcome change, for there was a conventional theory in the past that coloured people could live anywhere and on anything, that they revelled in squalor and had no desire for a better standard. One noted suspiciously that these views closely resembled the arguments brought out to oppose slum-clearance and rehousing schemes at home. The health officers and experienced practitioners one met didn't hold with them. Then one day, on a visit to a famous estate, I managed to slip off to the workers' village and have a chat with the people themselves. One began with the women and babies, who were friendly as always. Presently a young man broke off from a group of onlookers and said insolently: "Have you come down here to laugh at de black folks living like pigs?" After a word or two of explanation they took me round their disgusting quarters quite willingly and showed me just what they objected to and what they wanted. Resentment was freely expressed that the company's officers had rehoused themselves in beautiful screened bungalows and had done nothing for the workers. This was no manufactured agitation but the spontaneous expression of simple people up against the fundamental realities of life.

In view of the recent riots it is well to recall the freedom from crime (except larceny), the decent behaviour and the kindly patience of the West Indian. Why have we made such a mess of a land where every prospect pleases and man is no more vile than usual? Most people know *some* of the answers but no-one knows *all* the answers to that query. Economic insecurity is one of the more obvious explanations. The main industries—sugar, cocoa, bananas—are on the verge of bankruptcy; only oil pays steadily. The explanation lies deeper, however, for even during a boom period—and there was great prosperity when I was out there—they did not spend money on health or indeed on any other public purpose. (The hospitals—and deplorable they are—are all run by the government.) Not one penny of the great fortunes made in the war was expended on any charitable or philanthropic project whatever. And the income-tax—if any—was only 1*s.* in the pound!

More fatal even than poverty was the lack of a communal sense of responsibility for the well-being of the workers. This is partly due to racial complexities, and partly to an obsolete political philosophy. One met prominent persons who really believed that trade-unions are dangerous revolutionary organisations, and that unless corrupted by bolshevik gold coloured folk would be content to sit like Ferdinand the Bull under the cork trees, just smelling the flowers, and never never asking for a share in the higher standards of living that the rest of the world enjoys. This is an illusion of the type which has drenched Russia and Spain in blood. The Almighty could of course have made such a people but I do not think He ever did.

One feels that if it is humanly possible Britain should in the near future take effective action to assist the colonies in clearing up these outstanding arrears of disease and misery. One can plead that here the medical officer of health is on the side of the angels—that he stands for social and moral security. In the stately words of old Simon (recently recalled by Prof. Major Greenwood): "side by side with pestilence there stalks a deadlier presence, blighting the moral existence of a rising population; rendering their hearts hopeless, their acts ruffianly and incestuous and scattering, while society averts her eyes, the retributive seeds of increase for crime, malevolence and pauperism."

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JULY 1, 1939

Notifications.—The following cases of infectious disease were notified during the week: Smallpox, 0; scarlet fever, 1751; diphtheria, 882; enteric fever, 30 (29 "expected"); pneumonia (primary or influenzal), 449; puerperal pyrexia, 162; cerebrospinal fever, 26; acute poliomyelitis, 3; acute polio-encephalitis, 2; encephalitis lethargica, 6; dysentery, 57; ophthalmia neonatorum, 90. No case of cholera, plague or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on July 7 was 2922, which included: Scarlet fever, 718; diphtheria, 549 (carriers, 11); measles, 17; whooping-cough, 784; puerperal fever, 19 mothers (plus 8 babies); encephalitis lethargica, 306; poliomyelitis, 3. At St. Margaret's Hospital there were 24 babies (plus 12 mothers) with ophthalmia neonatorum.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 1 (0) from enteric fever, 5 (0) from measles, 2 (0) from scarlet fever, 16 (1) from whooping-cough, 16 (2) from diphtheria, 21 (6) from diarrhœa and enteritis under two years, and 9 (3) from influenza. The figures in parentheses are those for London itself.

Huddersfield reported the only death from typhoid. Sunderland and Stoke-on-Trent each had two deaths from whooping-cough. Fatal cases of diphtheria were scattered singly over 14 great towns, Birmingham reporting 2.

The number of stillbirths notified during the week was 237 (corresponding to a rate of 36 per 1000 total births), including 28 in London.

LETTERS TO THE EDITOR

CHEMOTHERAPY AND THE WHITE CELLS

SIR,—Although very few are now in doubt as to the immense value of the sulphonamide group of drugs in certain infections, those who are watching the literature dealing with them must be gravely concerned about the increasing number of reports of agranulocytosis associated with their use. Once again we are reminded that there must always be danger in the administration of large quantities of a foreign chemical substance—we have to pay a price.

Dr. Sutherland's report in your issue of May 27 tells the story of the fourth case that has occurred in this hospital during the last two years (three in which the elimination of polymorphs from the blood-stream was complete and one of neutropenia—40 per cent. polymorphs). A fifth case was recently admitted with complete absence of polymorphs (W.B.C. 850) after receiving 40 g. of sulphanilamide in seventeen days before admission. She died within thirty-six hours.

An incomplete survey of the literature shows that during the same period at least twenty-seven cases in adults and three in children have been reported or briefly referred to, making a total of thirty-five up to date. From reports reaching me privately I conclude that a larger number of cases have been recognised in this country but not published; and—what is still more disquieting—there can be little doubt that others again have died unrecognised because leucocyte counts were not made. Therein lies the danger. As Dr. Sutherland points out, the clinical picture of agranulocytosis presents nothing characteristic—the so-called agranulocytic angina often does not occur or develops only shortly before death; it was present in only one of our five cases. If white-cell counts are not made at short intervals, the patient's rising fever and deteriorating general condition may readily be ascribed to an exacerbation of the septic infection for which he or she is being treated. The three cases referred to by Dr. Crofton in his letter in your issue of June 24 illustrate well the insidious onset of this condition; he also points the way to the avoidance of the danger.

Very little is yet known about the pathology of agranulocytosis. It has been reported occasionally in association with streptococcus infections apart from any treatment by sulphanilamide or amidopyrine or related drugs, but the recognition of so many cases since the introduction of the sulphonamide group of drugs makes it almost certain that the administration of these drugs has usually been the deciding factor. Whether the presence of the drug itself in the circulating blood, or some derivative of it, is directly responsible, or whether again the condition may be due to a combination of factors, possibly including something unusual in the metabolism of the patient, we do not yet know. Until the condition can be induced in experimental animals these questions will probably remain unanswered.

Meanwhile, a survey of the recorded cases yields some points that are worthy of attention:—

(1) It is clear that agranulocytosis resulting from the sulphonamide group of drugs is a very fatal complication—more than 50 per cent. of the patients having died.

(2) Agranulocytosis may be met with after treatment by any of the sulphonamide group of drugs. Most of the recorded cases have occurred in association with sulphanilamide itself (perhaps because this drug has been more extensively used than any other), but already six cases have been recorded after the administration of M. & B. 693, as well as three cases of neutropenia. So far as I am aware, only one case has occurred when Red Prontosil alone was given.

(3) The relationship of the amount of drug administered and the duration of treatment to the development of agranulocytosis is striking. In twenty-four adult cases reported in sufficient detail the average dose administered was 48 g., and the duration of treatment was twenty days. In only two cases was the total amount less than 30 g. (20 g. of M. & B. 693 in one case; 18 g. of sulphanilamide in the other). It is also worth noting that in no less than eleven cases out of nineteen in which the details of treatment are given the fall in the leucocyte count took place during a second or third or fourth course of treatment.

These data seem to point to a fundamentally important conclusion—namely, that there is not much margin between the amount of sulphanilamide which appears to be necessary to control a severe streptococcus infection (20–30 g.) and that which, in some people, involves a serious risk of agranulocytosis (30–60 g.). (Comparable figures for M. & B. 693 cannot yet be given.) If that conclusion is right, it shows, I think, where we have gone wrong in our employment of these valuable new remedies. We have continued them too long in cases which have not made a prompt response. Our experience at Queen Charlotte's Hospital has been that, if a patient's temperature chart and general condition do not show unmistakable improvement within the first five or six days of treatment, it is unlikely that there will be any response from further treatment. When hæmolytic streptococcus infections have not responded satisfactorily, it has usually been, in our experience, because the organisms are not sensitive to the drug (as shown by an in-vitro test). Other puerperal infections, except some by staphylococcus and the urinary infections by *B. coli*, have almost invariably not responded, and, in my opinion, should not be treated by these drugs.

Since it is not practicable to make frequent white-cell counts in every case treated, I suggest the following procedure as a reasonably safe compromise—at any rate for the treatment of febrile conditions. If a patient's fever is subsiding satisfactorily under treatment and the general condition shows corresponding improvement, there is no need to do white-cell counts for the first six days—and the drug may be continued for a further two or three days without anxiety. If, on the other hand, the temperature does not show a prompt response, or there are other disturbing symptoms, such as headache, white-cell counts should be done every second or third day from the beginning of treatment. Similarly, in every case in which more than 25 g. has been given or treatment prolonged for more than ten days, white-cell counts should be done at short intervals.

May I add a further note with regard to the treatment of agranulocytosis since varying opinions are being expressed about the value of Pentnucleotide and of transfusion. Three of the four patients who developed the condition in this hospital have recovered (the fourth was a case of endocarditis), and the astonishing recovery of Dr. Sutherland's patient when her condition seemed absolutely hopeless has taught us that one need not despair, even if the leucocyte count continues to fall after the drug has been stopped. The intramuscular injection of pentnucleo-

tide (0·35 g. twice daily) certainly seemed to induce a definite rise in the leucocyte count *before blood-transfusion* in one of our cases, but we are inclined to think that both measures have proved useful. Since we seek especially to provide the patient with normal leucocytes, it seems to me reasonable to use defibrinated rather than citrated blood, taken from donors in whom a leucocytosis has been induced—e.g., by intramuscular injection of nucleinic acid (Parke Davis's "Veterinary Nuclein") 2 c.cm. four or five hours earlier (Colebrook, L., *Proc. R. Soc. Med.* 1926, **19**, 31). A simple calculation will show that 2 litres of blood containing 12,000 white cells per c.mm. given (by the drip method) to a patient with 6 litres of blood should raise the polymorph count from 0 to approximately 2400. In some cases the transfusion may need to be repeated.

I am, Sir, yours faithfully,

LEONARD COLEBROOK

Queen Charlotte's Hospital Isolation Block, Hammersmith, W.6, July 6.

THE PROBLEM OF MEDICAL LITERATURE

SIR,—Your correspondents have suggested various remedies for the present chaotic state of the production and distribution of medical literature. The production is a special aspect of scientific communication which was vigorously discussed by Sir William Bragg in his presidential address to the Royal Society last autumn. I need not discuss here the solutions under consideration. As to distribution, Mr. Barnard has pointed out the ways in which librarians are already tackling the problem. Britain has an unrivalled wealth of medical libraries, but their collections are not coördinated and do not cover the whole field. The union list of their periodicals which Mr. Barnard is compiling for the Library Association will be an indispensable guide to these collections, and it is to be hoped an incentive to coördinate and complete them.

The scheme of coöperation between certain medical libraries in London, which Mr. Barnard also described, has a more immediate purpose. May I speak more fully of its aims, and if possible clear up the misunderstanding which underlies such criticism as Mr. Thornton's, who wrote of the dangers of unofficial coöperation? Coöperation between the libraries of the London School of Hygiene, the Medical Research Council, the Royal College of Surgeons, and University College has been officially approved by the authorities of each institution with the active collaboration of their scientific staffs. Our purpose is to begin with this small group of libraries so that our efforts may be practical from the start. We hope that other libraries may join us later, including those of societies which serve their own members and not the profession in general.

The coöperating librarians will consult one another regularly for the correlation of their activities. We mean to attack limited objectives one by one. We have begun with the coördination of subscriptions to current periodicals. We do not intend to evade duplication where this is required by the scientific workers in each institution; but already in a few months we have cleared up much uneconomic duplication. The unwanted periodicals will be discontinued in each library solely to make money available for buying periodicals not yet taken by any of the libraries. The working of the scheme depends, as Mr. Barnard says, on successful inter-library lending. But it is essential that it should not be a matter of "librarians persuading their committees," but of close collaboration between librarians and scientific workers.

Some of your correspondents have suggested a committee or conference to discuss the problem; is there not need for a wider organisation, a permanent association of medical men and librarians to plan and foster a system of mutual help between all medical libraries? Any schemes for a central library or a central abstracting service must take into account the wealth of medical literature already in the country. We who have started this coöperative scheme in London believe that this wealth can be most fully used by correlation of the existing medical libraries, both in collecting the literature and in making it fully accessible through organised service.

I am, Sir, yours faithfully,

W. R. LE FANU,
Librarian.

Royal College of Surgeons of England, London, W.C.2, July 10.

THE NEW ZEALAND POSITION

SIR,—The remarks of your Australasian correspondent on July 1 (p. 53) will doubtless call forth a reply in time from New Zealand; but, as one who has just returned from a visit to the Dominion, I feel bound to point out that your readers may get a false impression from what your correspondent writes. His contribution is suspiciously like a bit of special pleading for the government and does not give a fair account of what is happening to the profession there.

During long negotiations the government rejected the proposals put forward by a unanimous profession. The contracts mentioned were for maternity benefit only, the thin end of the wedge. The figures given for the doctors' acceptances are correct; but no mention is made of the fact that only a very small minority of the maternity nurses signed their contract.

No authentic actuarial report on the social security scheme has been published, although it is alleged that an experienced health-insurance actuary was employed. It seems to me that the scheme is top-heavy and that the government will be only too glad to blame the doctors if it fails to operate smoothly.

I am, Sir, yours faithfully,

WM. BROWN.

Byethorne, Galashiels, Selkirkshire, July 8.

PROPRIETARY NAMES OR PHARMACOPŒIAL EQUIVALENTS

SIR,—For some time past we have been impressed by the widespread use of proprietary names for certain drugs, particularly in the prescribing of sedatives. The following quotation from the recently published "Textbook of Medical Treatment" by Various Authors (Livingstone, 1939) illustrates our contention:—

"It is a wise plan to arrange for the patient to have a succession of good nights at the beginning of treatment, by giving a mild hypnotic-analgesic (e.g. *medinal* gr. v with aspirin gr. v, *luminal* gr. iss with aspirin gr. x, or one of the proprietary preparations such as Empyrin or Veganin)" (p. 734). (Italics ours.)

The fact that we are able to quote this example from a book in which great care is taken to give pharmacopœial equivalents wherever possible indicates how well established the habit has become.

We feel that in these anxious days this whole question assumes a new urgency in view of the fact that, whether we prefer these proprietary drugs or

not, we may be soon deprived of any possibility of using many of them. In our opinion it would be a valuable service to the profession and to the nation if you could give due prominence to the alternative British or pharmacopœial names for foreign drugs.

We are, Sir, yours faithfully,

T. FERGUSON RODGER,
JOHN D. SUTHERLAND,
SUSANNAH DAVIDSON.

Great Western Road, Glasgow, W.2, July 10.

*** For several years we have printed proprietary names with an initial capital letter on their first appearance in any article, and in editorial pronouncements we have preferred to use the pharmacopœial equivalents. We shall increase our efforts to make them more familiar.—ED. L.

PSYCHOTHERAPY BY LAYMEN

SIR,—The published conclusions of the British Medical Association's mental-health committee with regard to the training and recognition of lay psychotherapists were recently considered by the committee of the British branch of the International General Medical Society for Psychotherapy (I.G.M.S.P.), who would like to submit the following comments for consideration.

While admitting the present disproportion between patients requiring psychological treatment and those qualified to give it, the solution of this problem by the training of lay psychotherapists is open to the following objections.

1. The proposed lay psychotherapist, unlike other medical ancillaries, will in fact carry out work which is indistinguishable from that undertaken by the medical psychotherapist and consequently must come into direct competition with him.

2. The possibility of relegation of this work to a lay assistant lowers the status of psychotherapy and so of psychological medicine as a whole, with the result that the present endeavours to improve both undergraduate and postgraduate teaching in this subject may be relaxed, to the detriment of medicine as a whole.

3. There are serious practical difficulties in the proposed relationship between the diagnosing physician and the lay therapist which may be fraught with serious danger to the patient.

Psychiatric diagnoses can often only be arrived at in the course of prolonged observation while the patient is undergoing treatment, and it is difficult to see how the lay psychotherapist could be trained in a reasonable space of time to undertake this and at the same time assess the importance of physical factors which so frequently intervene.

4. The important issue at present is to increase the facilities for and adequacy of the training of medical psychologists, since at present there are lamentably few who are really competent to supervise treatment by a lay psychotherapist. The provision of training for the latter may only prove a makeshift policy which will delay the major necessity. Furthermore it seems premature to institute training for the laity when the criteria for medical training for the specialty have not yet been settled.

Finally, it is still more important to awaken the public to the importance of adequate prevention and treatment in the mental-health field.

We are, Sir, yours faithfully,

E. B. STRAUSS,
President of the British branch;
H. CRICHTON MILLER,
Vice-president of the Society;
R. HARGREAVES,
Hon. secretary of the British branch, International General Medical Society for Psychotherapy.

July 6.

PENSIONS FOR SPINSTERS?

SIR,—As founder and hon. national organiser of the National Spinsters' Pensions Association I would like to make a few comments on your leading article of June 24.

You are quite right in stating that the committee of inquiry did not seem to be able to come to any definite conclusion. Their report has rightly been called a neutral document from which one might read whatever one cared to read, according to one's sympathies or prejudices as the case may be. Contrary to your statement that our case failed to survive the cold light thrown upon it by the actuary, we claim that not one of the facts or figures in our "charter" was challenged; the actuaries merely dealt with the case from a different standpoint—in order to complicate it?

I wish also to correct your statement that we deplored our inability to *leave a pension to dependants*. We did no such thing, but we do insist that we do not get the same proportionate value for our 5½*d*. contribution as the man receives for his double contribution of 11*d*. A man's contribution of 11*d*. qualifies him for a pension at the age of 65, and also one for his wife on reaching that age. In the event of his death his widow is entitled to a pension of 10*s*. (at any age) and his children are eligible for maintenance until school-leaving age. For the spinster's contribution of 5½*d*. she can only qualify for a pension for herself at 65. If she dies before reaching 65 nobody belonging to her will receive any benefits; further, if she drops out of insurance before 65—as so many of them do—she loses her pension rights. (All her previous contributions are clear profit to the scheme.)

With regard to the "war spinsters," not only our association but all thinking people who have considered the statement of the actuary—that the war did not result in there being a greater number of single women—contend that if by statistics the "war spinsters" can be explained away, then by statistics any other fact can be explained away. There are hundreds of "war spinsters" within our ranks; statistics cannot dispose of them, and you will probably be aware that the press of the country has taken up the cudgels on our behalf with regard to this absurd statement of the actuary.

The report did, however, prove that our grievance with regard to the preferential treatment which is given to the widow is justifiable. It showed that the Government pay a subsidy of 35 per cent. to one section of the widow community, many of whom are young, able-bodied and childless, and 100 per cent. to the pre-act section at 55 years, the age at which the *paying* spinster demands her pension.

With regard to your remark about bath-chairs, I should like to ask how is anyone going to subside into a bath-chair on 10*s*. a week? I am well aware that at the present time all the nations are looking to the cradles, but surely the wealthiest nation in the world has not yet reached the stage when it must withhold support from its ageing people who have served it so well in the past. The women with whom our association is concerned—the ageing working spinsters—have contributed largely to the creation of the vast wealth of this country, which wealth at the present time is enabling us to hold our own amongst the nations of the world. These are the women who replaced the men during the last war, and of whom the war service has taken such a toll of their health.

It is widely known how the spinster has always shown a remarkable spirit of self-abnegation in respect of ageing parents and dependant relatives; this spirit has in many cases been responsible for her state of spinsterhood. Even now we are not asking that she be specially compensated for her wealth-creating and domestic services, but that she should have fair consideration along with the rest—that she should receive the same value for her contributions under the national health and pensions acts. The committee of inquiry were unable to prove that her grievance was not a genuine one.

We are sorry that THE LANCET has entered the ranks of our opponents, but we are happy to be able to state, with authority, that we have many staunch supporters in the medical profession, and in the House of Commons we have Members of Parliament who are supporting us not only as politicians but also as medical men.

I am, Sir, yours faithfully,

FLORENCE WHITE,
Hon. National Organiser, National Spinsters' Pensions Association.
21, Scholemoor Lane, Lidget Green, Bradford, Yorks.

PARLIAMENTARY INTELLIGENCE

ON THE FLOOR OF THE HOUSE

BY MEDICUS, M.P.

ON Friday of last week a thinly attended House of Commons listened to a statement by the Minister of Agriculture, Sir Reginald Dorman-Smith, on the milk industry. Compared with its predecessor, which was withdrawn in February because of opposition from farmers and distributors, the Government's present bill may be described as one having the milk left out and the subsidy left in. But it is unfortunately worse than that. The original bill provided for the setting up of a milk commission "to keep generally under review matters relating to the milk industry" and to advise and assist the Ministers. It created a constitution and a living brain for the milk industry, made provision for pasteurisation, and allowed for expenditure on research and education. But all this has gone.

The Minister began with an excuse when he said that since the withdrawal of the earlier bill it was "not now possible to introduce this session any fresh proposals which can even purport to be called comprehensive." Yet, as he said, the industry is one of outstanding importance. More than 150,000 farmers are engaged in dairy-farming and the annual output of milk and milk products is valued at more than £60,000,000, or about a quarter of the total value of agricultural output. The debate showed clearly that the purpose of this bill is to carry over the present unsatisfactory arrangements for milk-supply for a further period, but no new proposals are made and the vital problems of safe milk and of cheap milk are left in the air. Clause 2 gives powers to the Minister to make grants for cheap milk for school-children, expectant and nursing mothers and children under five; but there is considerable doubt as to how much milk will reach those for whom it is intended. Not a penny of the £250,000 voted last year for this purpose has yet been spent, and members not unnaturally asked what is the use of voting money for benevolent-sounding schemes if they are not put into operation. Another feature of the bill—one becoming common in connexion with subsidies—is that payments are to be made retrospectively as from Oct. 1, 1938; but as Dr. Haden Guest remarked, milk cannot be given retrospectively to the expectant and nursing mothers and children under five whom Parliament in July, 1938, intended to benefit.

The bombshell of the debate was left to the end when the Under-Secretary for Scotland, Mr. Wedderburn, in his reply left out all reference to future Government policy on pasteurisation. In reply to a question by Mr. A. V. Alexander he announced that the Government would do nothing, but recommended that local authorities—Glasgow was mentioned—should promote their own bills to secure powers in their own areas. The Government last year asked local authorities *not* to promote bills of their own. Now they have reversed that policy and ask them to do so if they wish. Sir Francis Fremantle was not alone in feeling disturbed at this proposal to "pass the buck" to the local authorities. The question that was in most members' minds was, "ought there not to be some definite protection for the community against disease?" And so the debate ended on a note which, as one agricultural member emphasises from time to time, was "thoroughly unsatisfactory."

FROM THE PRESS GALLERY

Milk Policy

IN the House of Commons on July 7 Sir R. DORMAN-SMITH, Minister of Agriculture, moved the second reading of the Milk Industry (No. 2) Bill. Since the former bill was withdrawn it had been necessary, he said, to re-examine the whole problem of milk policy. It was not now possible to introduce proposals which could even purport to be called comprehensive. Certainly the fitness and health of the nation would be improved by a greater consumption of milk. The Advisory Committee on Nutrition had recommended a pint a day as the desirable ration to aim at; whereas at present the average was less than half a pint. But the nation was becoming more milk-conscious; he paid a tribute to what the teachers had done in connection with the milk-in-schools scheme. As a result the number of children taking milk in schools in England and Wales had gone up from 900,000 to well over 3,000,000 and the number was still increasing. In the last milk-contract year the increase in the consumption of liquid milk was estimated at about 35,000,000 gallons net in England and Wales. As a result of the scheme for the encouragement of the production of clean milk at the present time over 40 per cent. of the total milk sales were now of at least "accredited" standard. Government assistance had also been directed towards the eradication of tuberculosis in cattle.

The existing milk legislation was due to expire on Sept. 30 next and the purpose of the present bill was to carry on to the end of September, 1940, the activities which had already been started. The measure had three main objects. The first was the encouragement of quality-milk production by the provision of Exchequer contributions towards the cost of premiums paid on quality milks by milk-marketing boards. The second was to provide Exchequer assistance for the milk-in-schools scheme and for the supply of milk at reduced prices to mothers and young children. The third was to put a bottom into the market for milk sold for manufacture into butter and cheese. The estimated cost to the Exchequer of these proposals was for the current milk year about £1,900,000 and for the next milk year about £2,200,000, in addition to the expenditure (£300,000 and £500,000) under the Agriculture Act in respect of milk from attested herds.

It was the intention to arrange for the supply of milk at reduced prices to local authorities so that they might undertake extensions of their existing schemes for the supply of milk either free or at reduced prices to nursing and expectant mothers and children under five. Already a scheme along these lines had been submitted by the main Scottish milk-marketing board for its area and had been approved. A similar scheme was now under consideration for England. In view of the increased consumption of milk in schools—and he desired to go on increasing that—and the proposed maternity-and-child-welfare cheap-milk schemes the bill did not provide for any overriding limit to the annual grants. The Exchequer grant for the coming year would be about £1,000,000, as compared with £500,000 a year hitherto, and about £800,000 for this year.

Mr. T. WILLIAMS, on behalf of the Labour Party, expressed approval of the subsidies for quality milk and for cheap milk-supplies for children and nursing and expectant mothers. They also entirely agreed with the continuance of the milk-in-schools scheme, for with milk at its present price it was impossible for millions of families to purchase the milk they required to keep healthy. But in view of the fact that 40 per cent. of herds reacted to the tuberculin test something more needed to be done. The government had set up a national veterinary service, but there were only 22 veterinary surgeons for the whole of the country, and he urged a much bolder programme of disease eradication and more research; but above all they needed better and cleaner farm buildings.

Mr. W. ROBERTS said the government had run away from the much bigger problem they might have tackled.

Dr. HADEN GUEST said that on health grounds nothing could take the place of milk; the present consumption was definitely below what it ought to be, especially among the poorest classes of the population. Under the Milk (Extension and Amendment) Act, 1938, £250,000 was set aside for the supply of milk to nursing mothers and children under five, but up to March 30 of this year none of it had been spent because the Minister had not been able to come to an agreement with the producers and distributors. Payments for milk were under the present bill made retrospective to 1938, but milk could not be given restrospectively to nursing mothers or children under five. He thought the Government were paltering with this question. The farmer got a very low price for his milk while the distributor got a very high price. The farmer should get a better price and the consumer should get his milk at a lower price. At present we had a policy of restricted production and restricted consumption and prices here were higher than in any European country, and higher than in many parts of America. He realised the difficulties of the Government, but it was surely time to put the organisation of the milk industry on an economical footing. The important thing was nutrition and health, and putting a child's needs at a pint a day at least a quarter of the children in the country were getting only one-fifth of the milk they needed. One generation of scientific nutrition and farming policy for the nation would transform the generation on which they were acting.

After further debate the bill was read a second time.

Later, on a money resolution, Dr. HADEN GUEST urged that there ought to be a guarantee that the milk that was to be sold was of a sufficiently high quality not to cause disease. The amount of tuberculous milk sold was a menace to the health of the community.

Sir R. DORMAN-SMITH said the Government wanted to encourage the improvement of milk. They were getting on with the eradication of tuberculosis. It was not everybody's opinion that pasteurisation was either necessary or desirable. Consumers if they desired pasteurised milk should be able to buy it. It was open for any local authority to present a bill.

Mr. ALEXANDER said he was wholly disappointed with the method of the Government in announcing their policy in this matter. They now found that the agricultural side of the Government at any rate was taking the side of those opposed to pasteurisation and leaving it to the initiative of local authorities to promote legislation. That was a retrograde step.

Brigadier-General BROWN said it was better policy to remove the disease from the herds than to take it out of the milk by machinery.

Sir FRANCIS FREMANTLE said that medical men had been careful to recognise the difficulties of the Government. Agriculturists should realise when they were calling for publicity in order to get the industry back to prosperity that their chief agents were medical men. The medical profession were practically unanimous that milk could be rendered safe. He hoped it would not be left to each local authority to introduce safeguards as to pasteurisation.

Sir R. DORMAN-SMITH said the whole question of milk policy was under consideration with a view to the introduction of legislation at a later date. He could not say what the policy about pasteurisation would be.

Scottish Health Services

In introducing the vote for the Department of Health for Scotland in the House of Commons, Colonel COLVILLE, secretary of state for Scotland, gave an account (reported last week) of the contribution the department had made and was making to the health and well-being of the people.

Mr. T. JOHNSTON, speaking for the Labour Party, admitted that great improvements had been made in the physical condition of the people, but urged that the figures for Scotland were disquieting when compared with those for England and Wales. They showed 417,000 cases of sickness and incapacity in Scotland in the course of the year and 31,000 of the insured population were out of work for a whole year because of sickness. There must, he said, be a tremendous amount of avoidable sickness and suffering among old-age pensioners.

Sir ARCHIBALD SINCLAIR, for the Liberal Party, agreed that there was much leeway to make up. Infantile mortality in Scotland was still 70 per 1000 as compared with 53 in England and Wales, and the other death-rates still compared unfavourably with those of England. He was glad the estimate for the Highlands and Islands medical service was being raised by £10,000, but that was not enough. One of the worst aspects of the health of school-children in Scotland was the condition of their teeth. Some 56 per cent. of the school-children had from one to four teeth decayed. Bad nutrition and bad housing were also causes of ill health which needed more attention.

Mrs. HARDIE pleaded for the establishment of clinics for rheumatism.

Mr. HENDERSON STEWART said that it was baffling to him to find that Scotland lagged behind in the race for health and better housing. He could only explain it by assuming that the Secretary of State was so overburdened that he had not the time necessary to think of the big problem of Scotland.

UNDER-SECRETARY'S REPLY

Mr. WEDDERBURN replying to points raised said that properly coördinated plans existed for the organisation of a casualty-hospital service in Scotland in the event of war. The Minister of Health and the Secretary of State for Scotland proposed, at a very early date, to lay before Parliament a white-paper which would give a comprehensive statement of the arrangements made in Scotland as well as in England. The Scottish Secretary would also, at the beginning of next week, issue to all hospitals in Scotland which would take an integral part in the emergency hospital service a statement showing the particular rôle they would be expected to play, and which would also state the approximate numbers of beds which they would be expected to set free for

casualties, the ways in which it was contemplated that these beds would be freed, the probable number of patients to be sent home and the number to be transferred to the institutions to which patients would be transferred from the hospitals. With regard to the Highlands and Islands, the Secretary of State had never felt justified in asking for the annual sum proposed in the report on the Health Services for last year, but increases had been obtained for a fairly large number of small objects, and the amount of grant payable this year showed an increase of £10,000 on the corresponding figure for last year, having risen from £96,000 to £106,000. With regard to dental services, the department's medical officer was at present engaged in making a survey of the school dental conditions throughout the whole of Scotland, with a view to making recommendations for the improvement of these services.

QUESTION TIME

JULY 6–12

Cheap Milk in Scotland

Mr. MATHERS asked the Secretary of State for Scotland how much of the Exchequer subsidy voted under the Milk (Extension and Amendment) Act, 1938, was being used to help maternity and child-welfare authorities to start cheap-milk schemes, and the price charged to the local authorities for the milk; how many authorities had inaugurated such schemes, and their names; how many expectant and nursing mothers were receiving milk free and for payment, and the price in the latter case; and how much milk was normally given daily in each case, and for what period.—Mr. COLVILLE replied: A sum of £16,050 has been provided in the estimates of the Department of Agriculture for Scotland for the current year in connexion with the sale of liquid milk at a reduced price to local authorities in Scotland for the purpose of their maternity and child welfare arrangements. A scheme by the Scottish milk marketing board was approved on Feb. 6, 1939. Local authorities within the board's area can obtain supplies at 8*d.* per gallon for ordinary milk or 9½*d.* per gallon for tuberculin-tested milk, plus the cost of distribution. Arrangements by Glasgow corporation under the scheme have been approved and proposals by six other authorities (the county councils of Dunbarton, Selkirk and Stirling and the town councils of Dumbarton, Dunfermline and Stirling) have been received and are under consideration. The arrangements provide that, normally, one pint of milk will be supplied daily, either free or at a price not exceeding 2*d.* to expectant or nursing mothers and to children under five years of age where the family income is within a scale adopted by the local authority and approved for the purposes of the scheme. So long as the applicant continues to be qualified there will be no limit to the period during which a supply of one pint daily may be given. The Glasgow arrangements came into operation only on July 1 and information as to the number of participants is not yet available.

Fresh Milk in Schools

Mr. DUNN asked the parliamentary secretary to the Board of Education how many schools, elementary or secondary, there were where fresh milk was not available for the children in England and Wales; and if he would say what was the reason for this and what he proposed to do to correct it.—Mr. KENNETH LINDSAY replied: The number of public elementary school departments in England and Wales in which it is known that milk was not available in any form on March 31 last was 1574 out of a total of over 29,000. There were also certain other departments, the number of which it has not been possible to ascertain in the short time available, in which only dried milk was provided. On the same date there were 132 grant-earning secondary schools in which no liquid milk was available. The principal reasons for the failure to provide liquid milk are the difficulty of finding a supplier for small and remote rural schools, the inability of the medical officer of health to approve as safe the only milk available, and in a small minority of cases the unwillingness of the teachers to operate the scheme. An analysis of all these cases is being made with a view to ascertaining the reason in each case.

Mr. DUNN: Is this due in any degree to the operations of the Milk Marketing Board?— Mr. LINDSAY: I do not think so. In so far as the small rural schools are concerned we are now engaged with the Milk Marketing Board in trying to overcome this difficulty. If I explained the matter at greater length I could show that there are many other factors which enter into the question.

Milk for Mothers

Mr. BROOKE asked the Minister of Agriculture what percentages of the persons eligible were participating in each of the existing special area schemes for the supply of milk at a reduced price to nursing and expectant mothers and children under school age; and whether the price per pint was the same in each case.—Sir WALTER WOMERSLEY replied: My right hon. friend is informed by the Milk Marketing Board that, of the persons eligible to participate in the experimental schemes for the supply of milk at reduced prices to nursing and expectant mothers and children in the special areas, the proportions that have availed themselves of the facilities are 60 per cent. in Jarrow, 61 per cent. in Rhondda and Walker-on-Tyne, and 65 per cent. in Whitehaven. The milk is supplied at 2*d.* a pint, but in Whitehaven a special grant is made from the funds of the Whitehaven Council of Social Service and the Cumberland Friends' Unemployment Committee to enable certain applicants to be supplied with the milk at 1½*d.* a pint.

Maternity Hospital Accommodation

Mr. GORDON MACDONALD asked the Minister of Health what hospital accommodation for maternity cases existed in the Lancashire county council area, giving separate figures for the Wigan county area; whether he was satisfied that such provision was adequate to meet requirements, and, if not, what action he proposed to take to increase such accommodation to the necessary extent.—Mr. ELLIOT replied: Maternity accommodation in the county council's area is available at forty-six voluntary and municipal institutions. This provision appears to be generally adequate, but further accommodation is desirable in some particular districts. Five extension schemes are already contemplated. In the Wigan area, where seven beds are available at Billinge Infirmary, the need for extension is realised and is under joint consideration by the county and county borough councils. I am keeping the position under review.

London Maternity Services

Mr. DUNCAN asked (1) whether he was now prepared to give an emergency grant to the London voluntary maternity hospitals to enable them to tide over the difficulties which had arisen as a result of the passing of the Midwives Act, and in consequence of the new rules of the Central Midwives Board; and (2) if he was now in a position to give a reply to the points raised by a deputation representing the London Maternity Services Joint Committee, which interviewed him on April 19 last.—Mr. ELLIOT replied: The question of grants to training institutions is receiving consideration in connexion with the recommendations of the Interdepartmental Committee on Nursing Services, but I am not yet in a position to make a statement.

Foster Mothers

Dr. SUMMERSKILL asked whether he was aware that women who were totally unfitted, either from advanced age, ill health, or lack of morals, were able to take foster children provided notice was given to a local authority; and whether he proposed to take any action in the matter.—Mr. ELLIOT replied: I would draw the hon. member's attention to section 212 of the Public Health Act, 1936, under which the welfare authority have power to apply to a court of summary jurisdiction for an order to be made for the removal to a place of safety of a foster child about to be received by a person who, for such reasons as are stated in the question, is unfit to have the care of the child. The notice which under the act is required to be given to the welfare authority before a foster child is received for reward should afford the welfare authority

opportunity for action to prevent the reception of foster children by unsuitable women.

Black-listed Elementary Schools

Mr. DUNN asked the parliamentary secretary to the Board of Education how many elementary schools were still on the black list; and how many were provided or non-provided schools.—Mr. LINDSAY replied: The number of public elementary schools still on the board's list of schools with defective premises is 797 of which 225 are provided schools and 572 non-provided schools.

Replying to a further question by Mr. Dunn, Mr. LINDSAY said that a great variety of steps was being taken to correct the position. The main reason for the existence of defective schools at present was the failure to complete the reorganisation, and the only answer to that was to press on with reorganisation. In the case of schools which could be slightly altered, where reorganisation would not affect the problem, the answer was to do away with the obvious difficulties, and that work was being proceeded with.

Medical Education in West Africa

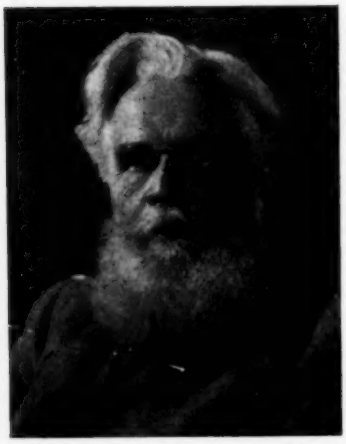
Mr. SORENSEN asked the Secretary of State for the Colonies whether, with a view to the more rapid development of an African medical service, he would make an inquiry into the possibility of creating a medical school in West Africa.—Mr. MALCOLM MACDONALD replied: A school of medicine has been established in Nigeria for a number of years and is making good progress. The whole question of the future development of higher education, including medical education, in West Africa is to be discussed at the conference of West African governors which is to be held in August.

OBITUARY

HENRY HAVELOCK ELLIS

L.S.A., F.R.C.P.

THE nineteenth century is often regarded as an age of unquestioning and self-satisfied complacency. This is not the whole truth, but it accounts for the battles that had to be fought by those original spirits who challenged the confident opinions of the majority. Among the foremost of these disturbers of tradition was Henry Havelock Ellis, who died last Saturday in London at the age of 80.



[Lafayette

Born a few months before the publication of the "Origin of Species," Havelock Ellis grew up in surroundings where sex was regarded as something shameful and apart from ordinary life. Its mention was scarcely permitted, and as the obverse to this reticence there existed an underworld which Havelock Ellis himself described in his own private diary at the age of 15, after an appreciation of the artistic merits of the statue of the nude Lesbia at Milan:

"But it is the form and the anatomy which principally struck me for their truth and naturalness. I will not specify instances of this because in our present fastidious and decorous age it would be considered a most indecent breach of propriety. Why so, I know not; perhaps I might be told that it would corrupt youth. Though how that can be I know not when it is that same youth who gloats and revels in that which in his hands is transformed into filthiness. Oh! the vistas of disgusting filthiness in a schoolboy's mind which is ever creeping out of his mouth; which he scribbles everywhere; which he must commit to paper, which he must turn into filthy doggerel."*

It is clear that at that early age Havelock Ellis already had that impulse to examine and challenge accepted beliefs which dooms its owner to a struggle against one of our strongest social forces.

A few words about his upbringing may illustrate, if they do not explain, this habit of mind. Ellis came of East Anglian stock. The son of a seaman he spent his youth largely at sea, crossing the Pacific. His education was sporadic and discontinuous and his home life, although affectionate and intimate, was lived in circumstances which enabled him afterwards to say that absence makes conjugal hearts grow fonder. At the age of 16 he found himself in New South Wales teaching in remote schools, writing poetry, reading Shelley and James Hinton, and becoming convinced of the basic identity of science and mysticism which remained his creed. The inner story of these days remains to be revealed, but he might have become another Edward Carpenter had he not made up his mind that a study of medicine was essential to him in clearing up the problems of sex. After four years he returned to London and studied at St Thomas's where he qualified in 1889 at the age of 30. He practised medicine only for a few months and two years later he met Edith Mary Lees who shared his work for 25 years and was herself an essayist and novelist. Even in student days his output of literary work was extensive and varied; he then edited the Mermaid series of "Old Dramatists" and planned the "Contemporary Science Series" which ran usefully until 1914. In the year he qualified appeared "The New Spirit," the first serious challenge to complacency. It was almost universally condemned by reviewers and the reaction was a foretaste of the storm which burst in 1898 over the first volume of "Studies in the Psychology of Sex." One Bedborough, who had sold a few copies of the book, appeared at the Central Criminal Court; by pleading guilty he escaped punishment himself and prevented the presentation of a defence against the indictment which ran thus:

"a certain lewd, wicked, bawdy, scandalous, and obscene libel, in the form of a book entitled 'Studies in the Psychology of Sex: Vol. I. Sexual Inversion, by Havelock Ellis,' in which said book are contained among other things, divers wicked, lewd, impure, scandalous and obscene libels, and matters, which said book is, pursuant to the provisions in that behalf, of the Law of Libel Amendment Act, 1888, deposited with this indictment, . . ."

This description of the book expressed the spirit of the times and provides us with a measure of our change of outlook when we compare it with the respect now shown to the memory of Havelock Ellis. Perhaps we are too close to it to consider

* Quoted from Houston Peterson's Havelock Ellis, Philosopher of Love, London, 1928, p. 28.

impartially the advantages and disadvantages of our altered outlook. Of young people today of both sexes many can discuss and face frankly the problems and difficulties that must in any civilised community arise in connexion with the instinct of sex, which is at the same time powerful and in need of reasoned control. The picture that the young Havelock Ellis drew of the filthiness in the schoolboy's mind is, we may hope, no longer so true. There is, we know, more open laxity in sex behaviour than there was 30 years ago, though the influence of the last war had its effect in producing that. Perhaps we owe something to Havelock Ellis for our modern courage in openly attacking the incidence of venereal disease. He has taught us that the sexual perversions can now be approached, by some of us at least, as problems to be understood and not as examples of wilful depravity; homosexuality is recognised as a condition which, like normal sexuality, may occur in the best and worst of mankind and should be handled in the light of that knowledge.

Havelock Ellis himself was shy and retiring: he never appeared in public, never lectured, and, strange to say, rarely engaged in controversy except so far as he ably defended his views when presenting them in the written word. The example he gave of the calm pursuit of unpopular truth stands out in a world where the power of reason is becoming more and more stultified by appeals to the emotions of the herd. These qualities could not fail to impress.

"In some half-dozen conversations held in the course of the last fifteen years," writes C. P. B., "two of Havelock Ellis's characteristics impressed themselves upon me. The first was his generosity to writers on subjects within his special field. Since the war there has been a spate of books on the sexual question. The bulk of them contained little that was new; they consisted, for the most part, of second-hand versions of Ellis's ideas presented with little of his literary distinction and none of his philosophical detachment. Yet to the authors of these books he gave nothing but sympathy and encouragement; if criticisms were offered, they were couched in the politest of language. It was agreeable to find a great pioneer so completely devoid of petty jealousies. The second was his uncompromising refusal to allow himself to be lionised. Many were the organisations which sought to honour him; their invitations were always met with a gentle yet firm refusal.

"The range of Havelock Ellis's culture, though prodigious, is never oppressive; his writings bear the imprint of an acute yet meditative intelligence. His mind was delicately attuned to the rhythm and beauty of words, and he combined a quick sympathy for human beings with a philosophical detachment. His integrity and courage—a quality much called for by the hostility which his early writings provoked—sprang from his essential generosity; and from the mystical cast of his mind was derived his indifference to the outward marks of human esteem, his fundamental modesty and humility."

SYDNEY BACKHOUSE HULKE

F.R.C.S.

THE death of Dr. Hulke on June 10 at the age of 68 has removed a popular figure in the medical life of East Kent. He was the tenth link in a chain of doctors whose name is closely associated with Deal, where the Hulke family has practised since it was driven from the Low Countries by the Duke of Alva. He was in partnership with his brother and his nephew, both of whom predeceased him. Sydney Hulke was naturally a Middlesex man and following his famous uncle, John Whitaker Hulke, he took an early interest in the military side of surgery and after a period as surgical registrar he served in the South African war. From 1914 to 1918 he worked indefatigably in three hospitals at Deal and Walmer. "Hulke," writes F.R.C.S., "fulfilled one's ideal of the best type of British practitioners. Nature had gifted him with a fine physique, courage and sympathy, and these were used devotedly in the service of those who sought his professional aid. His temper could not be ruffled—he was never known to be discourteous; and the affection and esteem of all classes was shown by the enormous gathering of rich and poor at his graveside. The Hulke tradition is still handed on: his married daughter, Muriel Brander, is a fellow of the college."

DAVID MACMILLAN

M.D. EDIN.

A YEAR after his retirement Dr. Macmillan died on July 6 at Tunbridge Wells. He was a native of Kirkcudbrightshire, being born in 1867 at Chapel and educated at Ewart High School, Newton Stewart, in the neighbouring county of Wigtown. Thence he proceeded to Edinburgh University where after taking a degree in arts he graduated in medicine in 1891. In 1897, after a short period of assistantship in Farnworth, Lancashire, he went to Prestwich, Manchester, to join the late Dr. Leslie Jones in practice and he remained there for the rest of his working life. One who knew him intimately for many of these years writes of the way in which he endeared himself to all with whom he came in contact, and of his loyalty as a colleague. "He was a shrewd and kindly counsellor, indefatigable in his efforts to help, always activated by the highest traditions and ever scornful and intolerant of anything that, as we say in Lancashire, was not 'jannock.' In his busy life he had little time to cultivate hobbies, but when opportunity offered was very fond of a game of golf or bridge, both of which practices he told me he hoped to indulge in his retirement, so well deserved."

Dr. Macmillan leaves a widow, two sons and two daughters.

FOOTWEAR AND FITNESS.—At a meeting of the National Fitness Council for England and Wales, held in London on July 10, Lord Dawson said that the medical committee of which he is chairman is inquiring into the manufacture of suitable footwear for all classes of the community. Sir Kaye Le Fleming announced that a publication is to be issued giving simple rules for the acquisition and maintenance of personal health.

THE DIXON MEMORIAL HALL, DUBLIN.—The hall erected in Trinity College in memory of the late Andrew Francis Dixon, professor of anatomy and chirurgery in the University of Dublin, was publicly opened by Dr. W. E. Thrift, provost of the college, on July 3, in the presence of a large number of friends and former pupils of the late Prof. Dixon. The hall, which was built from the designs and under the supervision of Mr. F. G. Hicks, architect, will be used for meetings and examinations in connexion with the school of physic. Dr. T. G. Moorhead, regius professor of physic, gave a brief address in commemoration of Dixon's work and personality, and appreciations were added by Prof. J. K. Jamieson, Dixon's successor in the chair of anatomy, and by the provost. The funds for building the hall were got by public subscriptions amounting to some £2500, with the addition of a larger amount contributed by the board of Trinity College.

MEDICAL NEWS

University of Cambridge

Dr. A. M. Jones and Dr. R. E. Kenny have been elected to Elmore medical research studentships.

The title of the degrees of M.B., B.Chir. has been conferred on Gwendolen M. Allen-Williams (Newnham).

University of London

Prof. Frank Horton, F.R.S., professor of physics in the university, at Royal Holloway College, and a member of the senate since 1925, has been elected vice-chancellor for the year 1939–40. Lord Dawson, who has hitherto been a representative of the faculty of medicine on the senate, has been appointed as a coöpted member in place of the late Sir Frank Dyson.

Mr. Harry Stobie, M.R.C.S., has been appointed to the university chair of dental surgery and pathology tenable at the Royal Dental Hospital of London school of dental surgery.

Mr. Stobie, who is 56, studied at the Royal Dental Hospital and at St. Thomas's Hospital. He qualified L.D.S. in 1910 and for some time held the post of clinical assistant in the dental department at St. Thomas's Hospital. After taking his M.R.C.S. in 1911 he returned to the Royal Dental Hospital as demonstrator in operative dental surgery and tutor in dental anatomy and dental surgery. During the war he served with the R.A.M.C. as officer in charge of division V and surgeon-specialist at the Croydon War Hospital for Injuries of Jaws. In 1915 he became hon. assistant dental surgeon at the Royal Dental Hospital and in 1930 he was appointed to his present part-time posts of hon. dental surgeon, dean and director of teaching, and lecturer in dental surgery and pathology at the hospital. From 1932 to 1936 he also held the post of postgraduate instructor in oral surgery at the hospital. He is a member of the board of examiners in dental surgery of the Royal College of Surgeons of England and has also examined for the universities of Bristol and Birmingham. In 1935 Mr. Stobie attended the International Stomatological Congress at Bologna as representative of the Government, and he recently went at the invitation of the Egyptian government to inspect and report on the dental school at Cairo.

At recent examinations the following candidates were successful :—

D.P.H.

T. K. Abbott (not eligible to receive the diploma until December, 1939), Rosetta C. Barker, Lily Bennett, Margaret Brodigan, H. B. C. Carter-Locke, John Clark, C. S. Davies, D. O. Dickie, Jean Duncan Whyte, R. W. Elliott, C. N. Faith, Margaret A. B. Fleming, May E. M. Fleming, J. F. Houlihan, E. C. H. Huddy, J. M. Lawrence, H. A. Leggett, V. N. Leyshon, F. D. M. Livingstone, Jean J. Macdonald, J. P. McGladdery, R. W. Markham, Isobel M. S. Marshall, T. G. Martin, E. L. M. Millar, Anil Mukerji, Dorothea M. Norman-Jones, M. N. Pai, Peter Pau, M. M. Sircar, G. R. Taylor, R. C. Wofinden, Grace E. Woods, and Rowena Woolf.

DIPLOMA IN BACTERIOLOGY

H. L. Carruthers, W. J. Godden, D. F. Gray, G. J. G. King, Ian MacKay, C. D. Parker, *M. T. Parker, Y. S. Rao, Marion Ross, and L. B. E. Seneviratne.

* With distinction.

University of Aberdeen

On July 6 the honorary degree of LL.D. was conferred on Mr. Cyril Burt, D.Sc., professor of psychology in the University of London, and Dr. Alexander Low, professor of anatomy in the university from 1925 to 1938. The following degrees and diplomas were also conferred :—

M.D.—*J. D. MacLennan, †A. B. Christie, †A. M. Ramsay, J. C. Niven (in absentia), and R. W. H. Welsh.

* Awarded highest honours for thesis.
† Awarded commendation for thesis.

M.B., Ch.B.—Robert Semple (with first-class honours); Alison B. Cruickshank, J. I. Rice, R. L. Richards, and G. S. Riddell (with second-class honours); James Abernethy, L. H. Allan, Jessie E. C. Baird, J. E. A. Bartlet, K. M. Bell, C. A. Brown, P. L. Brunnen, W. N. Calder, I. W. Caldwell, W. D. Catto, George Cormack, D. A. Craib, Phyllis E. Davidson, Stewart Duff, John Duguid, Jean A. Ferguson, Marian M. Fergusson, Alice D. Findlay, H. R. Findlay, R. J. A. Fraser, Rose M. Fraser, L. D. M. Gavin, Helen W. Geddes, S. M. Gill, J. S. Hamilton, N. G. C. Hendry, J. A. Houston, Alexander Hunter, A. S. Jessamine, Charles Low, Douglas McBain, A. D. McGill, J. K. Mackay, I. A. R. Mackenzie, Margaret R. McKenzie, Malcolm MacLeod, Anne M. S. Macrae, N. H. Mackworth, R. G. Main, Eric Milne, W. S. Milne, John Morrison, C. F. Murison, Janet B. Patterson, I. D. Pennie, J. W. Rae, J. B. Raffan, Mary H. Reid, D. H. Rhind, John Scorgie, E. T. Shennan, G. M. C. Smith, Helen A. Smith, D. L. Stewart, J. C. Taylor, Elizabeth M. F. Tolmie, Sheena M. Tosh, Jean C. Twort, and P. B. R. Williams.

D.P.H.—Ann L. Shennan (with credit), David Barclay, C. E. Gorrod, J. J. T. Morrison, J. B. Petrie, G. L. Ritchie, C. J. Silver, and J. M. Thomson.

Royal College of Surgeons of England

Election to the council.—On July 6 three fellows were elected into the council to fill the vacancies caused by the retirement of Prof. G. E. Gask and Sir James Walton and by the death of Prof. Graham Simpson. The result of the poll was as follows :—

	Votes
Sir JAMES WALTON (London)	585
CECIL AUGUSTUS JOLL (Royal Free)	518
ROBERT JOSEPH WILLAN (Newcastle)	448
Robert John McNeill Love (Royal Northern)	414
Reginald Martin Vick (St. Bart's)	351
Robert Davies-Colley (Guy's)	342
Vincent Zachary Cope (St. Mary's)	275
Lennox Ross Broster (Charing Cross)	240
Ralph St. Leger Brockman (Sheffield)	198
Sir Lancelot Barrington-Ward (Great Ormond Street)	195
James Ernest Helme Roberts (St. Bart's)	191
John Bowman Hunter (King's College Hospital)	165
Julian Taylor (University College Hospital)	164
William Hugh Cowie Romanis (St. Thomas's)	156

In all 1669 fellows voted; in addition 17 votes were found to be invalid, and 2 votes arrived too late. Sir James Walton, Mr. Joll and Mr. Willan are all elected for the full period of eight years.

University of Manchester

At recent examinations the following candidates were successful :—

M.D.

Simon Almond, C. G. Eastwood (with commendation), Evelyn M. Holmes, A. E. Martin (gold medal), C. S. Parker, H. T. Simmons, and Colin Starkie.

FINAL EXAMINATION FOR M.B., CH.B.

Part II.—A. D. Leigh and M. D. Milne (with first-class honours); Mary Fleure and A. F. Williams (with second-class honours); G. T. Ashley, T. G. Barlow, Irene M. Bower, T. M. Brand, Frances M. Bullough, W. W. Burnett, T. E. A. Carr, G. R. Crawshaw, Olive I. Elkin, R. T. Grime, Joan Halstead, Cyril Hamwee, C. P. Heywood, Hannah Horton, W. L. R. Kenyon, Joseph Latham, Joyce Leach, R. A. Martin, A. P. Massie, Asa Mills, M. J. Parsonage, J. R. Platt, T. H. Redfern, Edward Ridehalgh, Benjamin Roditi, E. S. Rogers, M. S. Rowley, L. D. Rutter, J. E. Schofield, Barbara M. Statham, F. W. Taylor, M. R. Tomlinson, G. K. Tutton, and R. M. Winston.

Part I.—Arnold Ashworth, J. H. R. Barker, F. R. Brebner-Smith, Thomas Brittain, Gerald Caplan, Rachel Claiman, Hilary J. Crewe, J. G. Ferguson, E. S. Frazer, R. J. Gampell, James Gregory, Hilda R. Harris, Harold Hassall, Stanley Haythornthwaite, Irene E. Howorth, Margaret Jacques, Oscar Janus, P. W. Kippax, J. T. A. Lloyd, J. L. MacLean, William Mellor, Elsie L. Mettam, Catherine E. D. Nash, Christopher Parish, K. C. Prausnitz, T. F. Redman, Frank Robinson, Margaret H. Roscoe, J. C. Seddon, G. K. Spruell, J. K. Steward, T. A. Taylor, Edith M. Thorp, A. L. Tulk, Ena M. Walmsley, and Joyce Worthington.

D.P.H.

Part II.—Randle Bennett, Caroline J. Chalmers, William Fielding, G. M. Fleming, D. M. MacKechnie, H. D. B. North, R. M. Shaw, G. R. Walker, and A. B. White.

Part I.—S. G. Abelson, D. H. Anderson, H. S. Bagshaw, Caroline J. Chalmers, J. R. Davidson, William Fielding, G. M. Fleming, Neil Maclean, H. N. Osborne, Morris Pivawer, R. M. Shaw, Fred Stratton, and A. B. White.

University of Dublin

On June 28 the following degrees were conferred :—

M.D.—J. E. Gillespie.

M.B., B.Ch., B.A.O.—R. S. W. Baker, H. S. Boyce, W. F. Carpenter, A. C. Corbett, J. K. Craig, Edward Cullen, Matthew Daly, Jack Freedman, S. M. Freedman, Leslie Fridjohn, Arthur Graham, J. P. Gore-Grimes, Sylvia M. Hall, G. H. Henry, Myer Herman, E. G. Hobart, D. W. McCarthy, Noel McSharry, L. E. Morris, C. B. Robinson, C. H. Rutherford, G. S. Sheill, W. B. Welply, J. D. Whiteside, Frank de Burgh Whyte, V. T. Williams, and F. L. Willington.

B.Dent.Sc.—C. J. Dugdale and R. D. Jones.

At recent examinations at the school of physic, Trinity College, the following candidates were successful :—

M.D.

Marjorie R. E. Boyd, J. E. Gillespie, H. B. Sutton, and H. B. Wright.

FINAL EXAMINATION FOR M.B., B.CH., AND B.A.O.

Therapeutics and pathology.—Maude F. P. Bigger (first-class honours); G. S. Prince, W. G. D. Caldwell, and G. B. Gibson (second-class honours); Kathleen M. J. Morphy, Helen S. Watson, B. W. Wyllie, J. R. Hassard, D. W. Montgomery, C. E. Williams, Ivy K. Bayne, Ethna M. MacCarthy, J. N. Greene, E. D. Khan, A. F. Crowley, A. G. Lee, Margaret F. Y. Dixon, Alicia G. Pike, H. H. Robinson, T. J. N. Bates, J. D. Dennehy, A. R. B. Jackson, J. B. Dunlop, and G. F. Shaw.

Medicine.—J. D. Whiteside, David Selman, F. L. Willington, C. B. Robinson, G. F. N. Anderson, Sylvia M. Hall, Muriel

Bannister, J. K. Craig, L. E. Morris, and C. W. Bradfield (second-class honours); Lucia M. E. FitzGerald, Samuel Fine, W. E. Bamford, J. C. G. Moore, R. G. P. Heard, Matthew Daly, A. H. Isaacson, G. S. Sheill, Kathleen Dowling, B. S. Good, Olive S. H. Devlin, T. N. Arthur, N. J. Hogan, Tom Shier, Matthew Shreider, Jack Freedman, Arthur Graham, W. F. Carpenter, D. W. McCarthy, A. C. Corbett, E. F. Keating, N. C. Brown, C. H. Rutherford, G. A. Anderson, D. L. Harbinson, Frances M. C. Wolfe, and G. E. P. Kelly.

Surgery.—C. B. Robinson, Sylvia M. Hall, R. S. W. Baker, and F. L. Willington (second-class honours); P. M. Goedvolk, J. K. Craig, H. D. Chomse, J. D. Whiteside, A. C. Corbett, J. P. Gore-Grimes, E. G. Hobart, F. A. Hanna, Frank deBurgh Whyte, M. H. Waters, Myer Herman, W. B. Welply, W. F. Carpenter, Maureen C. Johnston, Arthur Graham, Matthew Daly, L. E. Morris, Edward Cullen, H. S. Boyce, and D. W. McCarthy.

Midwifery.—H. H. Balch and J. R. Healy (second-class honours); William Jones, K. T. Acton, P. C. Denham, R. W. Carey, E. G. Millar, T. H. Downes, Moira M. Mallagh, F. J. Queally, M. N. O'Riordan, Phoebina Eakins, and R. M. Halahan.

DIPLOMA IN GYNÆCOLOGY AND OBSTETRICS

R. A. Fairley, W. F. Joynt, and H. M. Ayoub (second-class honours); and M. A. Abed.

D.P.H.

Part I.—T. S. Agnew.

Part II.—J. C. Gaffney (first-class honours); J. G. Cunningham (second-class honours); and S. H. Morrison.

D.P.M.

Part I.—J. N. P. Moore (first-class honours)

The Dr. Henry Hutchinson Stewart scholarship in mental diseases has been awarded to Dr. J. N. P. Moore, the De Renzy centenary prize to Dr. J. C. Gaffney, and the Butterworth prize to Dr. F. L. Willington.

College of Physicians of Philadelphia

The Alvarenga prize of the college has been awarded to Dr. Harry Goldblatt, professor of experimental pathology and associate director of the institute of pathology of the school of medicine, Western Reserve University, Cleveland, Ohio, for his contributions to the pathogenesis of hypertension. The prize is awarded to the author of the best memorial upon any branch of medicine.

Society for Relief of Widows and Orphans of Medical Men

At a quarterly court of directors held on July 12, Dr. C. R. Kempster, senior vice-president being in the chair, one new member was elected; he was on his father's side the great-great-great-grandson of Sir George Baker, F.R.S., the first president of the society, and on his mother's side he bore a similar relationship to Dr. James Ware, the second president. A sum of £2425 was voted for the payment of half-yearly grants to 62 widows and 4 orphans. Membership is open to any registered medical man who, at the time of his election, is resident within a twenty-mile radius of Charing Cross. Particulars from the secretary at 11, Chandos Street, London, W.1.

Travelling Fellowships

The Medical Research Council announce that they have awarded Rockefeller fellowships in medicine to the following candidates who intend to work at centres in the United States during the academic year 1939–40:—

Guy Blackburn, M.B. Camb., F.R.C.S., demonstrator in anatomy, St. Bartholomew's Hospital, London.

John Carson Dick, M.D. Glasg., assistant pathologist, University of Glasgow and Glasgow Royal Infirmary.

John Louis Henderson, M.D. Edin., M.R.C.P.E., assistant, department of child life and health, University of Edinburgh.

Ronald Stanley Illingworth, M.D. Leeds, M.R.C.P., D.P.H., resident medical assistant and clinical pathologist, Hospital for Sick Children, Great Ormond Street, London.

Robert Manoah Kark, M.R.C.P., formerly demonstrator in pathology and registrar to medical outpatients, Guy's Hospital, London.

Edward Peter Sharpey-Schafer, M.B. Camb., M.R.C.P., first assistant, department of medicine, British Postgraduate Medical School, London.

The council have also awarded Dorothy Temple Cross research fellowships to the following candidates who intend to study problems of tuberculosis at centres abroad during the academic year 1939–40:—

Robert Roger Henderson, M.D. Lond., M.R.C.P., resident assistant physician, St. Thomas's Hospital, London.

Arthur Harold Makins Siddons, M.B. Camb., M.R.C.P., F.R.C.S., chief assistant, genito-urinary department, St. George's Hospital, London.

John Michael Vaizey, M.D. Camb., M.R.C.P., medical first assistant and registrar, London Hospital.

Royal Free Hospital

The A. M. Bird postgraduate scholarship in pathology for 1939–40 has been awarded to Dr. Audrey Fraser and the Mabel Webb and A. M. Bird research scholarship to Dr. Alice Stewart.

Middlesex Hospital

The prize-giving ceremony of this school will be held at the Queen's Hall, Langham Place, London, W.1, on July 20, at 3 P.M. Mr. S. A. Courtauld, chairman of the council of the school, will be in the chair. Prof. W. B. Tuck, D.Sc., will deliver an address on the chemical elements, and Sir Edward Mellanby, F.R.S., will distribute the prizes and medals.

A research fellowship in medical radiology to the value of £100 per annum has been endowed at the school by the Duke of Bedford in memory of his wife. The fellowship, which is to be known as the Duchess of Bedford fellowship, is intended to further experimental research in medical radiology. It is open to qualified men or women of any nationality, and may be held for a period not exceeding three years. The late Duchess of Bedford was a member of the Society of Radiographers.

Maudsley Hospital

Today, Friday, July 14, the Earl of Athlone, chancellor of the University of London, will open a new extension at this hospital. The institution owes its inception to an offer made in 1908 to the London County Council by the late Dr. Henry Maudsley to contribute £30,000 towards the cost of erecting and equipping a hospital for the early treatment of cases of curable mental illness, the provision of exact research, and the provision of medical teaching on such disorders. The building was originally designed to hold 108 beds, a number which has gradually increased to 200. In one year upwards of 4000 outpatients, including children, are now seen, while the number of inpatients admitted each year has grown to between 800 and 900. A new outpatient department, special treatment blocks, additional accommodation for the central pathological laboratory, and an operating-theatre were added in 1936. The present extensions include blocks for private patients in single rooms and a block specially designed for the inpatient treatment of children. Conditions for admission of private patients are that they shall go of their own free will and that the outlook for recovery is good. The children's block is described as a completely new departure; "nowhere in Great Britain is there specialised inpatient accommodation for children whose troubles need psychiatric investigation and treatment." A detached block has been constructed to serve as an outpatient clinic for children and is already in full work.

British Empire Cancer Campaign

At a meeting of the grand council of this campaign held in London on Monday last, the following grants were approved: £400 to Mount Vernon Hospital for research by Prof. F. Weigert; £495 to the Strangeways Research Laboratory, Cambridge, for the salary of its physicist; and £400 to Sir Robert Muir and Dr. P. R. Peacock for research at the Glasgow Royal Cancer Hospital by Dr. Stephan Beck. The total grants made this year now amount to more than £49,000.

The council approved of the formation of a University of Cambridge research centre of the British Empire Cancer Campaign. The initial committee to supervise this centre will consist of Dr. H. R. Dean, vice-chancellor and professor of pathology; Dr. J. A. Ryle, regius professor of physic; Sir Gowland Hopkins, F.R.S., professor of biochemistry; and Miss Honor Fell, director of the Strangeways Research Laboratory. The centre will coördinate all cancer research at Cambridge and will itself initiate and direct research in the same way as the recently formed University of Oxford research centre of the campaign. The council acceded to a request for affiliation from the Cancer Research Fund Committee (1934) of Northern Ireland.

Mr. J. A. Crowther, Sc.D. (professor of physics in the University of Reading), Mr. H. T. Flint, D.Sc. (director of physics at Westminster Hospital), Dr. R. W. Scarff (hon. secretary of the scientific committees of the campaign) and Dr. D. G. Walker (representing the British Dental Association) were elected members of grand council.

An Appointment to India

Prof. F. C. Minett, D.Sc., director of the research institute in animal pathology at the Royal Veterinary College, London, has been appointed director of the Imperial Veterinary Research Institute of the government of India.

Leverhulme Research Fellowships

A Leverhulme fellowship has been awarded to Mr. D. Ll. Griffiths, clinical assistant in the orthopædic department of Manchester Royal Infirmary. Mr. Griffiths will compare the radiological and histological features in bone tumours.

Amalgamation of Hospitals at Newcastle-on-Tyne

The governors of the Newcastle Throat, Nose, and Ear Hospital have decided to amalgamate the hospital with the throat and ear department of the Newcastle Royal Victoria Infirmary. The joint hospital will be housed in a new building adjacent to the infirmary.

A Visit to Germany

The offices and warehouses of Bayer Products Ltd. will be closed from noon on Friday, July 21, until 9.30 A.M. on Tuesday, July 25, when the entire staff of 150 from the London, Manchester, and Dublin offices of the firm is being taken to Germany for a long week-end visit to the Bayer laboratories at Leverkusen and Elberfeld. Urgent supplies during this period can be obtained from Messrs. John Bell and Croyden, 50, Wigmore Street, London, W.1 (Welbeck 5555), or from Mr. R. Woolby Brooke, 38, Gloucester Road, London, S.W.7 (Western 0123).

Appointments

AUCHINLECK, G. M., L.R.C.P., resident assistant pathologist at the Royal Free Hospital, London.

BARRETT, N. R., M.Chir. Camb., F.R.C.S., surgical registrar at the Hospital for Consumption, Brompton.

BOLTON, MARJORIE, M.B. Lond., medical officer to the V.D. department, Guy's Hospital, London.

BONNELL, JANE, M.B. Lond., assistant medical officer at the Harmston Hall Colony, Lincolnshire.

BOYD, MARJORIE, M.D. Dubl., M.R.C.O.G., resident assistant obstetrician at Kingston County Hospital, Surrey.

CABLE, J. V., M.D. N.Z., M.R.C.P., resident assistant medical officer at the Redhill County Hospital, Edgware.

CLEGG, J. W., M.R.C.S., assistant in clinical pathology at the British Postgraduate Medical School, London.

COLLINS, L. A., M.B. Camb., D.P.M., assistant county medical officer for Dorset.

COMERFORD, C. H., M.D. Dubl., D.P.H., D.P.M., deputy medical superintendent at Bexley Hospital (L.C.C.).

CRAWFORD, A. V. B., M.B. Dubl., D.P.H., assistant medical officer of health for Barnes.

CRAWFORD, F. J. H., M.D. Lpool, D.P.H., barrister-at-law, deputy medical officer of health for Cornwall.

FAIRLIE-CLARKE, G. A., M.B. Lond., resident surgical officer at the Kent and Sussex Hospital, Tunbridge Wells.

FERRIMAN, DAVID, D.M. Oxfd, M.R.C.P., first assistant in the medical outpatient department of the London Hospital.

FITZGERALD, E. J., M.D. N.U.I., medical superintendent at South Ockendon Colony, Essex.

FITZGERALD, F. P., M.B. Dubl., F.R.C.S.I., assistant surgeon to the orthopædic department of the St. John Clinic and Institute of Physical Medicine, London.

GOUDIE, MARGARET M., M.B. Glasg., assistant medical officer for Middlesex.

GRAY, CHARLES, M.B. Manc., F.R.C.S., first assistant in the department of surgery of the British Postgraduate Medical School, London.

INSH, ALICE M., M.B. Glasg., assistant medical officer at the Stirling District Mental Hospital.

LLOYD, O. G., M.B. Lond., D.P.H., assistant medical officer of health for Newport, Mon.

LODGE, THOMAS, M.B. Sheff., D.M.R.E., first assistant in the department of radiology, Royal Sheffield Infirmary and Hospital.

MEADOWS, S. P., M.D. Lond., M.R.C.P., assistant physician to the Maida Vale Hospital for Nervous Diseases, London.

MITCHELL, EVELYN, M.B. Edin., outpatient medical officer at the Belgrave Hospital for Children, London.

MOIR, A. R. M., M.B. Edin., D.P.H., deputy medical officer of health for Oldham.

MURRAY, C. J. B., M.S. Lond., F.R.C.S., surgical registrar at the Radcliffe Infirmary, Oxford.

PILKINGTON, FRANCIS, M.B. Camb., M.R.C.P., D.P.M., deputy medical superintendent at the Warwickshire and Coventry Mental Hospital.

RACKOW, A. M., M.B. Lond., D.M.R.E., radiologist to the Evelina Hospital for Sick Children, London.

SCHNEIDER, ROBERT, M.R.C.P.E., resident assistant physician at Kingston County Hospital, Surrey.

SCHOLEFIELD, G. L. M., M.B. N.Z., resident surgical officer at the Royal Masonic Hospital, London.

SEWELL, J. P., M.B. Melb., D.L.O., registrar at the Central London Throat, Nose, and Ear Hospital.

SHARP, H. S., M.B. Camb., F.R.C.S., chief assistant to the ear, nose and throat department, St. Thomas's Hospital, London.

THOMSON, J. M., M.B. Aberd., senior assistant medical officer at the Isolation Hospital, Romford.

TUBBS, O. S., B.Chir. Camb., F.R.C.S., surgical registrar at the Hospital for Consumption, Brompton.

WALSHE, F. M. R., M.D. Lond., F.R.C.P., member of the civil consulting staff to King Edward VII Convalescent Home for Officers, Osborne.

*WAUDBY-SMITH, W. F., M.R.C.S., assistant school medical officer for Berkshire.

*WEBB, JOSEFINE W., M.B. Lond., assistant medical officer for Berkshire.

WERBELOFF, LESLIE, M.B. Cape Town, D.M.R.E., assistant radiotherapist to the Royal South Hants and Southampton Hospital.

WRIGHT, GAVIN, M.B. Camb., resident anæsthetist at the Queen Elizabeth Hospital, Birmingham.

Hospital for Sick Children, Newcastle-on-Tyne.—The following appointments are announced:—

OGILVIE, A. G., M.B. Durh., M.R.C.P., hon. physician;
WATTS, WELDON, M.S. Durh., F.R.C.S.E., hon. surgeon;
KELLETT, C. E., M.D. Camb., M.R.C.P., hon. assistant physician;
DAVISON, GEORGE, M.D. Durh., M.R.C.P., D.C.H., hon. assistant physician; and
FEGGETTER, STEWART, M.S. Durh., F.R.C.S., hon. assistant surgeon.

Colonial Medical Service.—The following promotions are announced:—

CALLANAN, J. C. J., M.D. Dubl., assistant director of medical services, Kenya;
CARMAN, J. A., M.D. Lond., D.T.M. & H., specialist (anæsthetist), Kenya;
HAMILTON, J., M.D. Glasg., D.P.H., D.T.M. & H., senior health officer, Nigeria;
HENRY, G. H., L.Med. Dubl., medical officer, Nigeria;
MACKAY, A. G., M.B. Edin., D.T.M. & H., senior medical officer, Tanganyika Territory;
RAWSON, P. H., M.R.C.S., senior medical officer, Nigeria;
ROBERTS, C. E., B.M. Oxfd, F.R.C.S.E., D.T.M. & H., specialist, Zanzibar;
SHELLEY, H. M., F.R.F.P.S.G., M.R.C.P., D.T.M. & H., senior medical officer, Tanganyika Territory; and
SMITH, W. H., M.B. Dubl., D.P.H., medical officer, Kenya.

Vacancies

For further information refer to the advertisement columns

Anglesey County Council.—Asst. county M.O.H., £600.
Banbury, Horton General Hosp.—Res. M.O., at rate of £150.
Barrow-in-Furness County Borough.—Deputy M.O.H. and asst. tuber O., £550
*Bearstead Memorial Hosp., Underwood Street, E.*1.—Res. M.O., at rate of £100.
Beckenham, Bethlem Hosp., Monks Orchard.—Res. H.P., at rate of £150.
*Belgrave Hosp. for Children, Clapham Road, S.W.*9.—Asst. physician.
Benenden, Kent, National Sanatorium.—H.P., at rate of £150.
Birmingham Maternity Hosp.—Res. M.O. and registrar, £200.
Blackpool, Victoria Hosp.—H.S. to surgical unit 2, at rate of £175.
Brighton, Royal Alexandra Hosp. for Sick Children.—H.P., £150.
Brighton County Borough.—Sen. M.O. and asst. to M.O.H., £800.
Burnley, Victoria Hosp.—H.P., at rate of £150.
Burnley County Borough.—Asst. M.O., £500.
Cambridge, Addenbrooke's Hosp.—H.S., at rate of £130.
Colchester, Royal Eastern Counties' Institution.—Asst. M.O., £350.
Coventry and Warwickshire Hosp.—Res. M.O., £300.
Croydon County Borough.—Asst. M.O.H., £400.
Dudley, Guest Hosp.—Res. surg. O., at rate of £250–£300. Also H.S., at rate of £150.
*East Ham Memorial Hosp., Shrewsbury Road, E.*7.—Hon. radiologist.
Essex County Council.—District tuber. officer, £700.
*Evelina Hosp. for Sick Children, Southwark, S.E.*1.—H.S., at rate of £120.
Glasgow Western Infirmary.—Medical radiologist.
Godalming, Surrey County Sanatorium.—First asst. M.O., £570.
Grimsby and District Hosp.—Res. officers, at rate of £225 to £150.
Harrogate, Royal Bath Hosp.—Res. M.O., £200.
Henley-on-Thames, Berks and Bucks Joint Sanatorium.—Second res. asst. M.O., £350.
Hull, Beverley Road Institution.—Asst. M.O., £350.
Hull Royal Infirmary.—Second H.P. and second cas. O., each at rate of £150.
Ilford, King George Hosp.—Hon. anæsthetist.
Kettering and District General Hosp.—H.P., at rate of £150.
Lancaster Royal Infirmary.—Jun. H.S., at rate of £130.
Leicester, City Isolation Hosp. and Sanatorium, Groby Road.—Res. M.O., at rate of £300.
Liverpool Heart Hosp., Oxford Street.—H.P., at rate of £100. Also clin. assts.
London County Council.—Sen. asst. M.O. (grade II), £500. Asst. M.O.'s (class I), each £350. Also asst. M.O.'s (class II), each £250.
London University.—University readership in morbid anatomy, tenable at British Postgraduate Medical School, £800.
Manchester, Ancoats Hosp.—Two H.S.'s, one for orthopædics and one for joint post of H.S. to ear, nose and throat dept., and house physician, each at rate of £100.

* Subject to confirmation.

Manchester, Christie Hosp. and Holt Radium Institute.—Asst. M.O., £400. Also sen. and jun. res. surg. O.'s, each at rate of £150.
Manchester, Langho Colony for Sane Epileptics.—Med. supt., £1050.
Manchester, Park Hosp., Davyhulme.—Res. surg. O., £500.
Manchester, Royal Children's Hosp., Pendlebury.—Res. surg. O. and asst. M.O. for outpatients' dept., each at rate of £150.
Manchester Northern Hosp.—Res. H.P. and res. H.S., each at rate of £100.
Manchester Royal Eye Hosp.—Jun. H.S., £120.
Manchester Royal Infirmary.—Hon. asst. surgeon. Jun. asst. M.O. in radiological dept., £350. Med. chief asst., £300. Chief asst. to surgical unit, £250. Asst. surgical officer, £70. Also H.P.'s and H.S's, each at rate of £50.
Manchester Victoria Memorial Jewish Hosp.—Part-time clinical pathologist, £200.
Mansfield and District General Hosp.—H.P., at rate of £150.
Margate and District General Hosp.—Res. M.O., £150.
Mexborough, Yorkshire, Montagu Hosp.—Res. surg. O., £400.
Middlesbrough, Poole Joint Sanatorium, Nunthorpe.—Med. supt., £900.
Ministry of Health.—Medical officers, each £850.
Newcastle-upon-Tyne, Royal Victoria Infirmary.—Hon. physician.
Northampton General Hosp.—H.S., at rate of £150.
Nottingham General Dispensary, Hyson Green Branch.—Res. M.O., £300.
Oldham County Borough.—Temporary asst. M.O.H., £500.
Paddington Metropolitan Borough.—Temporary asst. M.O. for air raid-precautions services, £500.
Portsmouth, Saint Mary's Hosp.—Jun. asst. res. M.O., £250.
Prescot, Whiston County Hosp.—Sen. res. M.O., £400.
Preston County Borough.—Asst. M.O. for maternity and child welfare, £500.
Prestwich, Near Manchester, County Mental Hosp.—Asst. M.O., £550.
*Princess Elizabeth of York Hosp. for Children, Shadwell, E.*1.—Dental surgeon.
*Queen's Hosp. for Children, Hackney Road, E.*2.—H.S. and cas. O, each at rate of £100.
Royal Air Force.—Dental surgeons.
*Royal College of Physicians, Pall Mall East, S.W.*1.—Milroy lecturer.
Royal Naval Medical Service.—Medical officers.
St. Helens Hosp., Lancashire.—Hon. surgeon and deputy. Honorarium £250 for the dual post.
*St. John's Hosp., Lewisham, S.E.*13.—H.S., £100.
*St Mary's Hosp., W.*2.—Second res. anæsthetist, at rate of £125.
*St. Peter's Hosp. for Stone, &c., Henrietta Street, Covent Garden, W.C.*2—H.S., at rate of £75.
Sheffield Royal Infirmary and Hosp.—Res. H.S. to ophthalmic dept., at rate of £80–£120.
Southend-on-Sea General Hosp.—First H.S., at rate of £100.
Stafford, Prestwood Sanatorium.—Jun. asst. M.O., at rate of £300.
Stockport County Borough.—Asst. M.O.H., £500.
Taunton, Taunton and Somerset Hosp.—H.S., at rate of £125.
Tunbridge Wells, Kent and Sussex Hosp.—H.S. and cas. O., £150.
*University of London, King's College, Strand, W.C.*2.—Lecturer in physiology, £350.
Ventnor, Royal National Hosp. for Consumption.—Asst. res. M.O., at rate of £250.
Wakefield, Clayton Hosp.—H.S., at rate of £175.
Walsall General Hosp.—Res. surg. O., £300.
*Weir Hosp., Weir Road, Balham, S.W.*12.—Sen. res. M.O., £250.
West Malling, Kent, Leybourne Grange Colony.—Asst. res. M.O., £350.
Wickford, Runwell Hosp. for Nervous and Mental Disorders.—H.P., at rate of £150.
Wolverhampton, Royal Hosp.—Asst. res. M.O. for gynæcological and obstet. dept., at rate of £100.
York County Hosp.—H.S. to eye, ear, nose and throat dept., £150.

Medical Diary

July 17 *to July* 22

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.
TUESDAY.—5.30 P.M., general meeting of fellows.
WEST LONDON MEDICO-CHIRURGICAL SOCIETY.
TUESDAY.—5 P.M. (West London Hospital, W.8), general meeting.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.
TUESDAY.—4.30 P.M., Sir Arthur Hall: Meningitis and Acute Infections of the Central Nervous System.
WEDNESDAY.—NOON, clinical and pathological conference (medical). 3 P.M., clinical and pathological conference (surgical).
THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration. 3.30 P.M., Dr. A. A. Moncrieff: Hygiene of the Newborn Child.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. J. B. Hume: Hernia and Its Treatment.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

ST. GEORGE'S HOSPITAL, S.W.1.
THURSDAY.—5 P.M., Dr. Anthony Feiling: neurological demonstration.
HOSPITAL FOR SICK CHILDREN, Great Ormond Street, W.C.1.
THURSDAY.—2 P.M., Mr. J. H. Doggart: Causes and Treatment of Squint in Children. 3 P.M., Mr. Wylie McKissock: The Diagnostic Value of Ventriculography and Encephalography in Intracranial Diseases.
Outpatient clinics daily at 10 A.M. and ward visits at 2 P.M.
FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.
MONDAY to SATURDAY.—HOSPITAL FOR DISEASES OF THE SKIN, Blackfriars Road, S.E., afternoon course in dermatology.—ALL SAINTS' HOSPITAL, Austral Street, S.E.11, afternoon course in urology.

Births, Marriages and Deaths

BIRTHS

DARBISHIRE.—On July 8, at Bowness-on-Windermere, the wife of Dr. S. B. Darbishire—a daughter.
DUNLOP.—On July 10, the wife of Dr. J. Leeper Dunlop, of Tetbury, Glos.—a son.
FISHER.—On July 3, at Abingdon, the wife of Dr. J. H. Fisher—a son.
MACEWAN.—On July 7, the wife of Dr. Alastair MacEwan, of Llandudno—a daughter.
MONTGOMERY SMITH.—On July 4, the wife of Dr. W. Montgomery Smith, of South Norwood—a daughter.
RIVERS-MOORE.—On July 4, at Port Shepstone, South Africa, the wife of Dr. Francis Rivers-Moore—a daughter.
SMALLHORN.—On July 5, at Ruskington, Lincolnshire, the wife of Dr. Thomas Smallhorn—a son.

MARRIAGES

HERTEN-GREAVEN—PORTER.—On July 8, at All Souls' Church, South Hampstead, Edgar C. Herten-Greaven, F.R.C.S., to Patricia Margaret Porter.
SPRATT—BARRY.—On July 1, at St. Ethelburga's, London, Leslie Spratt, M.B., to Gladys Ida Barry.
TAYLOR—BARBOUR.—On July 8, at St. Andrew's Presbyterian Church, Cheam, Robert Bicket Taylor, M.B., to Phyllis Jean Barbour.

DEATHS

BLAIR.—On July 8, at Claygate, Surrey, Charles Samuel Blair, M.D. Durh., F.R.C.S., late of Richmond.
BROWN.—On July 9, at North Bersted, Sussex, David Brown, M.B. R.U.I., of Tientsin, N. China.
BUCHANAN.—On July 9, at Watford, James Ronald Buchanan, M.B. Lond., in his 37th year.
BUCKLAND.—On July 8, at Bournemouth, Francis Oke Buckland, M.D. Edin., aged 81.
ELLIS.—On July 8, at Hintlesham, Suffolk, Henry Havelock Ellis, L.S.A., F.R.C.P., in his 81st year.
HAMILTON.—On July 8, at St. Thomas's Hospital, Dennis Godfrey Hamilton, M.R.C.S.
HOLROYDE.—On July 2, at the Citadel Military Hospital, Cairo, George Graham Bedingfield Holroyde, M.C., L.M.S.S.A., lieut.-colonel R.A.M.C.
MADDICK.—On July 6, Edmund Distin Maddick, C.B.E., F.R.C.S.E., of Hove, aged 85.
PURDIE.—On July 7, James Purdie, M.B. Glasg., of Brentford, aged 48.
RECKITT.—On July 8, at Hatch End, Middlesex, Edward Bass Reckitt, V.D., M.D. St. And., lieut.-colonel R.A.M.C.(T.), retired, late of Little Hadham, Herts, aged 87.
SUMPTER.—On July 5, at Sheringham, Walter John Ernely Sumpter, M.D. Durh.

N.B.—A fee of 7s. 6d. is charged for the announcement of Births, Marriages, and Deaths.

THE LANCET 100 YEARS AGO

July 13, 1839, *p.* 572.

From William Farr's letter to the Registrar-General on the first annual report of births, marriages and deaths.

The registration of the causes of death, besides contributing to practical medicine, will give greater precision to the principles of physic, . . . Loose phrases are still current, for which numerical formulæ will be substituted. Sydenham, one of the most accurate of medical writers, in speaking of small-pox, employed such terms as these: (1661) "It prevailed a little, but disappeared again." (1667–9) "The small-pox was more prevalent in town for the first two years of this constitution than I ever remember it to have been." (1670–2) . . . These terms admit of no strict comparison with each other; . . . The present registry will furnish medical science with an unbroken series of observations expressed numerically.

NOTES, COMMENTS, AND ABSTRACTS

JENNER AS ROYAL PHYSICIAN

THE fact that Edward Jenner was appointed physician extraordinary to George IV is omitted from most accounts of his life, including those given in the Dictionary of National Biography and the Encyclopædia Britannica. Nor is any reference to it made in the latest study of him, reviewed in these columns on Nov. 11, 1933 (p. 1093). In the best documented of all biographies of Jenner written by John Baron and published in 1838, his appointment seems to have been discovered after the book had been written, because there is no mention of it in the text except in an appendix of documents, nearly all of which were found in the possession of Jenner at his death, and very prominently in the title, which runs "The Life of Edward Jenner, M.D., LL.D., F.R.S., Physician Extraordinary to His Majesty George IV. . . ." The document is listed thus: "1821. LONDON. March 16.—Appointment of Dr. Edward Jenner to be Physician Extraordinary to the King of Great Britain." Possibly, or even presumably, Jenner attended a member of the royal family for the purpose of vaccination. Queen Victoria was vaccinated in 1819, but we have not traced her vaccination to Jenner. The fact that Jenner was a very sick man in 1821 and died in 1823 may be the reason why his appointment was afterwards overlooked.

Baron's statement has received confirmation by the sale for £21 10*s.* at Sotheby's on June 12 of the original manuscript oath signed by Jenner in 1821 on his appointment as physician to George IV, together with a letter from Jenner returning the documents. At the same sale a letter from Marcello Malpighi to Cardinal Gastaldi in 1684, containing a diagnosis and prescription for the cardinal's sister, fetched £7 10*s.*, and nineteen letters (about thirty pages) from Lazaro Spallanzani on scientific subjects, 1766–93, were sold for £28.

THE BRAIN MADE EASIER

IN presenting what he calls "a materialistic conception of brain as an instrument of mind," Dr. R. J. Berry of Stoke Park Colony, Bristol, has attempted to describe in simple language and within the compass of a small book the structure, evolution and development of the human brain (Your Brain and its Story. London: Humphrey Milford, Oxford University Press. 1939. Pp. 165. 7*s.* 6*d.*). Written in lively style, the book opens with a biological summary of the development of nervous systems, starting with those of primitive and simple animals. There follows an interesting chapter on the basic types of brain and their recapitulation in man, and the author goes on to discuss, among other things, the twin nervous systems, the service of the senses, and how the brain works. The closing chapters deal with mental defect, its correlation with the size and demonstrable pathology of human brains, and some of its regrettable effects on human behaviour. Mr. H. D. Steele illustrates the book with many beautiful and accurate drawings. Unfortunately the complexity of the subject makes an exposition fully comprehensible to the layman almost impossible, but Dr. Berry has nearly achieved it.

TRANSFUSION SYPHILIS

No doubt there are many more cases of syphilis insontium than are revealed. Another example of conveyance of infection by blood-transfusion is recorded by F. Ronchese (*New Engl. J. Med.* 1939, **220**, 556). The patient was a boy of 13 who urgently required a transfusion for cachexia. The blood of the donor, a friend, was tested for agglutination, but no Wassermann examination was made. The transfusion was a striking success, but the boy developed a secondary rash in a few weeks, and it turned out that the donor had had a penile sore at the time he gave his blood.

Ronchese has questioned a number of American hospitals about their procedure with reference to serological testing of blood-donors. The answers to the questionnaire, if given at all, were often unsatisfactory and at best the donors were tested only every six months. Ronchese insists that much greater care should be taken and goes so far as to suggest that serological and physical examinations should be made immediately before every transfusion.

THE UNIT OF PRACTICE

"More importance," said Sydenham, "is to be attached to the desires and feeling of the patient, provided they are not excessive or dangerous, than to doubtful and fallacious rules of medical art." Prof. D. W. Propst of Illinois takes this as the text of a book written with the object of systematising his own knowledge of the general principles underlying the practice of medicine and of arranging that knowledge in a form palatable to students (The Patient is the Unit of Practice. Springfield, Illinois: Charles C. Thomas. 1939. Pp. 219. 16*s.*). The first part is concerned with the nature of disease, with constitution and heredity, man's adaptability to environmental changes, and his failure so to adapt, resulting in disequilibrium. The second deals with diagnosis—"the working hypothesis of the clinician"—and the third with the basic therapeutic principles of practice: rest, diet, symptomatic treatment and psychotherapy. The reader is reminded of Allbutt's words, that the patients and not the diseases are the entities. This is one of the lessons to be learnt from a book, which, though it contains nothing strikingly original, is nevertheless a useful digest of much of that vaguely appreciated knowledge, steadily acquired and often subconsciously applied during a clinical lifetime.

MEDICAL JOURNALS AND BOOKS FOR CHINA

Dr. JOAN MCMICHAEL writes:—"The China Medical Aid Committee has recently received an appeal from Dr. Lim of the Chinese Red Cross Training School, at Kweiyang, for medical journals and medical and surgical textbooks. This training school, in the words of its own report, 'is attempting, in the fire of war, to build a firm base for the national health service of the new China.' It coöperates with the Chinese Red Cross, the Army Medical Service Corps, and the National Health Administration.

"Many of your readers who do not file back issues of their medical journals would doubtless be willing for them to be used in such a cause. May I therefore take this opportunity of appealing through your columns to the profession both for medical journals (numbers for the past two years would be most welcome) and for medical textbooks suitable for the training of young doctors, nurses, dressers, and ambulance units? Surgical and first-aid textbooks are most urgently required, but any good recent (within the last five or ten years) textbooks would be gratefully accepted. Journals and books should be sent to Dr. Joan McMichael, Organising Secretary, China Medical Aid Committee, 121, Westbourne Terrace, London, W.2. Journals may be sent monthly, or collected and sent for several months together. All books and journals will be forwarded direct to China, and the British Fund for the Relief of Distress in China, to which we are affiliated, is able to secure free carriage for us."

THE MEDICAL DIRECTORY.—Messrs. J. and A. Churchill Ltd. write: "To maintain the accuracy of our annual volume we rely upon the return of our schedule, which has been posted to each member of the medical profession. Should the schedule have been lost or mislaid we will gladly forward a duplicate upon request. The full names of the doctor should be sent for identification." Messrs. Churchill's address is 104, Gloucester Place, London, W.1.